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469

Application, Transcript, Small Exhibits, Etc.

ASE 469: Neil H. Wills, et al, application or approval secondary-recovery project (by ater flooding), 208, 28E, Eddy County, N.M.

NEIL H. WILLS ET AL
PRELIMINARY WATER FLOOD SURVEY
RUSSELL POOL
EDDY COUNTY, NEW MEXICO

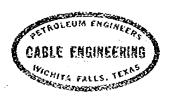
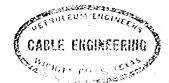


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TELEPHONE - 3-2167



POST OFFICE BOX - 2249

WICHITA FALLS, TEXAS

December 5, 1952.

Mr Neil H. Wills Et Al, P. O. Box 529, Carlsbad, New Mexico.

Dear Mr Wills:

Pursuant to your request, we submit herewith a preliminary water flood survey of your oil producing properties in the Russell Pool, Eddy County, New Mexico.

We have examined all available data including core analysis, well logs, production records, isopach and structure maps, and repressuring history.

Our conclusions are as follows:

- 1) The ultimate recoverable oil from all leases by present producing methods will be approximately 990,208 gross barrels. The future recoverable oil by present producing methods as of November 1, 1952 will be approximately 163,500 gross barrels.
- 2) From production history, the Russell Pool appears to be adaptable to water flooding if old gas input wells are not used for water injection.
- 3) Pilot flooding is the most feasable method of determining the floodability of the field.
- 4) If pilot flooding is successul, the entire field should yield approximately 900,000 gross barrels of water flood oil in addition to the ultimate recovery by present producing methods.

Our recommandations are as follows:

1) The George Turner No. 5 well should first be recompleted in the 900-foot limestone as a source of flood water.

2) A pilot flood should be initiated as described in this report at a cost of \$ 24,241.00.

3) If pilot flooding proves sufficiently beneficial, a complete flood should be initiated at an additional cost of \$ 59,231.00.

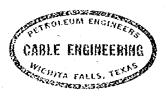
We will be pleased to discuss this report with you at your convenience.

Yours very truly,

CABLE ENGINEERING,

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Reger Lawis.



PURPOSE

The purpose of this report is to determine the most feasable pilot water flood program for the Russell Pool, Eddy County, New Mexico.

LOCATION

The Russell Pool is located in the Southeast quarters of sections 12 and 14 and in section 13, Township 20 South, Range 28 East, Eddy County, New Mexico, approximately twelve miles northwest of Carlsbad.

HISTORY & GENERAL INFORMATION

The Russell Pool was discovered in March 1945 with the completion of Wills et al Number 1 in the southwest quarter of Section 13 for an initial production of 29 barrels per day. This lease is also designated as the South Battery lease. The productive formation, Yates Sand, was topped at 786 feet and easing set at 737 feet.

The pool has been developed rather slowly because pipe line facilities were lacking in this area. The Artesia Pipe Line Company completed a gathering system in 1946. The last well producing was completed in August 1948.

The field has been gas repressured since July 1949 with success as can be seen from individual lease decline curves. The average gas-oil ratio at the inception of gas repressuring was 1200-1400 cubic feet per barrel and at the



HISTORY & GENERAL INFORMATION (Cont'd)

present time is approximately 3000 cubic feet per barrel.

The Yates sand, Permian in age, is penetrated at approximately 800 feet in depth. The structural features controlling the accumulation of oil is primarily a monocline with a small closure near the center of Section 13. The gross thickness of the producing sand ranges from zero to approximately 40 feet, but averages approximately 20 feet.

The gravity of the oil ranges from 36 to 38 degrees
API and has a viscosity of 5.7 centipoise at 92 degrees
Fahrenheit. This viscosity is favorable for flooding.

WO TO LOUIS

DRILLING AND COMPLETION

The wells were drilled with a rotary rig and pipe set approximately 50 to 100 feet above the saturation and completed with cable tools which includes a heavy shot with subsequent cleaning out as part of the completion work. The approximate cost of drilling each well is \$7,000.00



COMPLETION RECORDS WILLS ET AL-NORTH AND SOUTH LEASES

Well No.	Elev.	Top Pay	Est. Sat. Thick-	Csg. Seat	Total Depth	Init. Produc- tion	Completion Date	Elev. Top Pay	Remarks
-	-		ness			***************************************			
1	3244 3244	786 785 817	50 5# 50	737 756 780	9 06 8 10		3-25-42	5,16,1	Sand
2	3244	785	24	756	810	29 45	4-5-42	2459	Send
, 3 .	3253*	817	20	780	844	45	8-22-43	2436	Sand
A 4	3253	780		730	873 856		9-13-44	2473	Base Sand 810
# 576	3255 3247	830	30	770	879	J4	1-15-45 4-6-45	5157	· Maria
	3247	780 836 803 815 860 864	30 26 18 17	736 770 735 752 740	829	_	4-0-47	5+38 5+59 5+59 5+59	Sand
S S	3253	87.2	10	752	079		3-17-45	2430	Sand
F 0	3250	060	17	740	839 878 880		5-2-45 6-14-45	2390	Sand
500 7 8 9 10 11	3253 3253 3249	700°F	0 25 25	800 740	80 7	•	6-25-45	2396 2389 2469	Sand Sand
\$ 10 ·	3255	780 840	25	733	867	59/5 Hrs	9-21-45	2415	Sand 217' Liner
11	3277	OTO	<i>a.</i>)	733	007	7777 MLB	Juziary	2717	Cemented
12	3248	800	23	689	825	1,8	2-5-46	5448	Sand
ี จิ๊จ	3242	772	21	657	797	45	2-21-46	57.20	Sand
13 14	3240	756	C.ACO	655	993	Gas	7-17-46	5484 5470	Show Oil Sat. Low
Ĩ5	3241*	772 756 764	1.3	662	993 784	36	7-30-46	2477	Sand
15 16	3241*	795	13 16	657 655 662 681	、812	36 45 15	8-16-46	2446 2446	Sard
17	3241*	778	20	679 668	808 782 849 847 854	15	9-30-46	2463 2476	Sand
17 18 19 20 21	1241*	778 765	20 16 21 16	668	782	12 36 15 40	9-30-36 8-28-46	2476	Sand
19	3252 3253 3254	820 824	- 26	775 717 732 749	849	36	6-29-47	2432	Sand
20	3253	824	21,	717	847	15	7-7-47	2432 2429	Sand
21	3254	832 846		732	8524	40	7-20-47	2422	Sand
22	3256	846	21	749	870	50 40	7-29-47	2410	Sand
23	3258	860	23	752	883	40	8-9-47	2398	Sand

^{*} Estimated

COMPLETION RECORDS GEO. TURNER-SOUTH-MIDDIE-NORTH LEASE

Well No.	Elev.	Top Pay	Est. Sat. Thick- ness	Cag. Seat	Total Depth	Init. Production *	Completion Date	Elev. Top Pay	Remarks
Ţ	32500 32000 3000 3000	795 814 841	18	712 724	908 873 869 815 1028 850 808 814 850 870 813	22 36 50 100	9-14-42	2450	Pay, Sandy Lime
2	3250	814	18	724	873	36	10-26-42 2-25-43 4-7-43	2436	Pey - Sand
A STATE OF THE PARTY OF THE PAR	3250	841	<u> 21</u>	723	869	_50	2-25-43	2409	Pay - Sand
TABLE OF THE PARTY	3250	790 842 8 26	21 25 0 19	725	815	100	4-7-43	2460 240 9	Pay - Sand
	3240	842	-0	710	7058	Dry	6-3-43	2398 2426	Water Below 855'
277	3252	826	19	<u>73</u> 2	850	50	Q_U_U_U_	2426	Sand
3 (1	3248	and the		714	808	50	9-23-14		Lime
	3250	787 824 841	20	702	814	60	10-24-44	2463	Sand
	3252	024	23	720	850	60	1-25-45	2428	Sand.
CYSTE ENGINEERING	3220	947	53	725 725 725 720 734 702 706 803	870	Dry 500 600 600 888 835 450 150 150 40	9-23-44 10-24-44 1-25-45 5-1-45 5-25-45	5/165 5/103	Sand
12	3250	700	50	803	ฉัาวิ	50	5-25-45	2462	Sand
	3220	020	24	767	852 81.7	82	7-30-45	54.54	Sand
#5	3270	027	<u>,1</u> 44	742	844	80	6-19-46	2425 2446	Sand
12	3270	700	27	175	632	80	7-14-46	2446	Sand
12	3272	707	72	277	810	30	9-16-46	2453	Sand
10	3250	788 826 831 804 789 797 823	57	767 745 795 731 738 736 686	835 810 826 843 829 834 824 828 868	20	9-16-46 11-27-46 2-20-47	2455	Sand
16	3250	700	20	720	043 966	150	2-20-47	2427	Sand
10	3520	200	30	734	029	120	4-2-47	2453 2451	Sand
20	3250	799 799 795 789 846	3T	404	201	150	5-12-47 7-9-48	2451	Sand
21	3250	720	20	296 296	024	00	7-9-40 e 10 la	2455	Sand
22	3250	ALA	20	742	020	30	7-17-48 8-6-48	2467	Sand
13 14 15 16 17 18 19 20 21 22 23	3250 3250 3250 3250 3250 3250 3250 3250	790	26 23 26 21 21 21 21 21 21 21 21 21 21 21 21 21	682	804	30 40	7-24-48	2404	Sand
فسي	JEJV	770	4. 3	UUZ	OUT .	***	1-24040	2460	Sand

* Estimated

COMPLETION RECORDS CROSBY ASASS

	Well No.	Elev.	Top Pay	Est. Sat. Thick- 1055	Csg. Seat	Total Depth	Init. Production	Completion Date	Elev. Top Pay	Remarks
HICHITA FALLS, TEXAS	A Sencince	3256 3260 3260 3256	844 836 896 867	37 43 6 19	751 775 795 746	881 908 900 890	100* 124* dry 50*	12-3-44 3-23-45 5-29-45 6-18-48	2 ¹ +12 2397 236 ¹ + 2389	Sand Water 60% Water 896: Sand

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ol			⊼x1.C0		
Original o	DIVIDUAL	WELI	TESTS		
Original Owner & Well Number Neil H. Wills Et Al 4	Oil Bbls No Test	Wate Bbls	r Goo	Gas/011 Ratio	Csg. H.
6 7 8 10 11 12	4.5 2.0 2.5 2.5 2.5 3.5	0005000	16,000 5,000 13,000 4,000 7,500 6,500	3555 2500 6500 888 3000 2600	12 10 12 10
16 17 18 19 20 3	2.0 4.0 3.0 3.5 5.0 3.5 5.0	00000000	7,000 8,000 8,500 7,500 2,000 5,000 4,000 5,000	2000 4000 21.25 2500 1000 5000 2400 1142	11 12 9 10 10 10 10

Λ	078011215000000000000000000000000000000000	0 16,00 0 13,00 0 13,00 0 7,50 0 6,50 0 8,000 0 8,500 0 8,500 0 7,000 0 6,000 0 7,000 1,000 1,000 1,000 1,000	3000 2600	12 10 10 10 10 10 10 10 10 10 10	
George Turner	7 1.0	>,000	2554	10	
	3.0 10 11 12 13 14 15 16 17	0 10,500 0 4,500 0 22,000 0 12,500 0 10,500 0 4,500 0 7,500 0 5,500 0 28,000 0 4,700	4700 3500 3000 11000 6250 2625 4500 1875 2750 7000	10 10 15	
	19 3.5 20 No Test	0 18,000	3916 5142 2857	12	
George Turner Crosby Lease	23 0,5	0 4,700 0 5,800 0 3,000	854 2320 6000	14	
Total	4 5.5 52.	Q 4.000	2350 1000 2800	*	
Field Total	46.7 52.	0 167,100	<u>2800</u> 3578	.	

7.7 53.0 299,100

3077

COBLE ENGINEERING

PRODUCTION RECORDS

	Year	Month	Wills South		Turner North, South & Middle	Turner Crosby	Total	Cumulative Total
CABLE ENGINEIERING	1950	Jan. Feb. Mar. Apr. May. Jun. Jul. Aug. Sep. Oct. Nov. Dec.	11:	515 259 796 29891 24650 38592 40543 29150 2892 2848 2861 2868 2868 2868 2886 2571 2254 2254 201 2254 201 201 201 20147	320 18454 25953 44153 47423 67900 57781 44470 3555 2932 3294 3205 2315 2411 2161 2229 2564 2103 2020 31742	450 10277 8972 9748 8189 6037 436 312 493 377 411 428 278 389 278 389 278 337 315	4935 29713 44199 100317 101883 349319 131742 95098 7930 6352 7600 7409 7694 6991 6628 6119 5850 6412 5694	4935 34648 78847 179164 281047 430366 562108 657206 665136 671488 679088 686497 694191 701182 707810 713929 719779 726191 731885 737609
					JAITE	4385	80403	

PRODUCTION RECORDS (Cont'd)

Year	Month	Wills South	Wills North	Turner North, South & Middle	Turner Crosby	Total	Cumulative Total
1951	Jan. Feb. Mar. Apr. May. Jun. Jul. Aug. Sep. Oct. Nov. Dec.	1167 932 1113 1016 920 902 863 792 734 866 770 813 10888	1946 1674 1718 1690 1674 1522 1435 1370 1323 1329 1367 1221 18341	1852 1875 2080 1799 1889 1856 1771 1812 1704 1723 1780 21849	281 283 270 353 243 244 242 2190 187 225 2966	5246 4764 5181 4858 4523 4523 4313 4216 3108 4104 4039 54044	742855 747619 752800 757658 762370 766893 771206 775422 779402 783510 787614 791653
1952	Jan. Feb. Mar. Apr. May. Jun. July Aug. Sep. Oct.	814 732 754 666 731 669 603 642 697 6921	1191 1164 1172 1127 1168 1071 1031 998 946 897 10765	1693 1599 1696 1594 1579 1451 1557 1380 1361 1459	221 194 206 197 183 184 207 217 203 188 2000	3919 3689 3828 3584 3661 3375 3398 3208 3152 3241 35055	795572 799261 803089 806673 810334 813709 817107 820315 823467 826708
ure	ind Total	398	270	375414	53024	826708	



ESTIMATE OF RECOVERABLE OIL PRESENT PRODUCING METHODS

The estimate of recoverable oil by present producing methods was made by the production decline method. The total field production was plotted and the resulting curve was extrapolated on logarithmic paper to an estimated economic limit. We estimate the total future recovery by present producing methods from the Russell Pool to be 163,500 gross barrels as of November 1, 1952. The total ultimate recovery by present producing methods for the field will be approximately 990,208 gross barrels. The estimated future and ultimate recovery by leases is tabulated in the recapitulation.

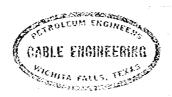
November 1, 1952 is 97.1 barrels per acre-foot. The Wills north battery has recovered 109.7 barrels per acre-foot while the other areas of the field have recovered approximately 90 barrels per acre-foot. The present and ultimate recoveries per acre-foot by present producing methods for the Wills-North, Wills-South, Turner-North, South and middle, and Turner-Crosby leases are shown in the recapital ulation. These recoveries were based on gross rather than net sand volume and therefore seem quite low for sand production.

Our original estimate of recoverable oil by primary production and repressuring which was made in 1948 during

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ESTIMATE OF RECOVERABLE OIL by PRESENT PRODUCING METHODS (Cont'd)

flush production was 1,151,167 gross barrels. The estimate made at this time of 990,208 gross barrels incorporating the production history since 1948 is more reliable.



ESTIMATE OF RECOVERABLE OIL by WATER FLOODING

An important item of information necessary in planning a large scale water flood and predicting the recovery therefrom is core analysis data. Sufficient core analysis data are lacking in this field to make predictions which will be of great value. The single core analysis from the Wills et al No. 26 well, which was cored with oil base mud to determine the existing water saturation in the sand. The analysis showed the core to bare an average water saturation of 47.4 percent. This water saturation is higher than ordinarily exists in sands which can be successfully flooded. However, this core showed some shale which may have given up some water when heated to retort temperature.

A pilot flood will be the most reliable method of determining the floodability of this field and for obtaining an idea of what additional recovery can be expected. It is not uncommon in successful water flooding to recover as much oil as was possible by all other methods of production.

As no significant volume of water has been produced to date, the high water saturation reported by core analysis could easily be in error. If this flood is successful, the additional recovery by water flooding should be approximately 900,000 gross barrels.

RECAPITULATION OF RECOVERABLE OIL

		Oil Prod. as of 11-1-52	Est. Future Recv. by Pres. Prod. Methods as of 11-1-52	Ult. Recv. by Present Producing Methods	Sand Vol.	Prod. Area Acres	of 1	very as 1-1-52 Bb1/AoFt	Ult. R Pres. Method Bbl/Ac	8
	Russell Pool	826,708	163,500	990,208	8511	442	1870	97.1	2240	116.3
CABL	Wills-North	242,281	48,381	290,662	2209	113	2144	109.7	2572	131.5
អូភ្ កា	% 11s-South	155,989	33,241	189,230	1729	102	1529	90.3	1855-	109.6
MOSINE	Turner-North, South and Middle,	375,414	72,524	446 , 938	3965	192	1955	94.7.	2328	112.7
100	Turner-Crosby	53,024	10,354	63,378	610	34.4	1541	86.9	1842	103.9

RECOMMENDED PILOT FLOOD PROGRAM

As the character of the Yates sand is different in the southern part of the Russell Pool than in the central and northern part, it will be advantageous to test the floodability of both areas by pilot injection. We believe that a 20 acre 5-spot will be the most profitable pattern as no additional wells will have to be drilled for input purposes. Although this pattern is quite wide for flooding a sand only 800 feet deep, it has two distinct advantages in this particular field. First, a 20 acre 5-spot pattern will minimize the danger of water channeling through streaks of high gas saturation that have contributed to the abnormally high gas-oil ratio history. Second, this pattern will allow the gas injection wells to remain in service while water flooding which could not be done on the closer 10 acre 5-spot pattern. Due to the high ges-oil ratios in this field, the present gas injection contributes as much reservoir energy as will be possible to gain by water flooding. Of course, gas has not the oil displacing ability that water has, but from a standpoint of maintaining pressure and thereby reducing the volume of water necessary, it is just as valuable. The chief disadvantage to the wide spacing is that less water can be injected because fewer input wells will be incorporated. This disadvantage may be overcome by drilling producing wells in the virgin areas between water g cable exemetrize h

input wells if the flooding progress proves to be too slow. Drilling additional producing wells between water input wells will alter the pattern to a 10 acre 5-spot, but will not necessitate injecting water into old gas injection wells. We recommend that the flood be begun on the wider spacing which is 660 feet between unlike wells and 933 feet between like wells. This will result from converting alternate product.

As a pilot injection project we recommend converting the following six producing wells to water input wells as shown on the field map: Wills et al Nos. 6, 10, and 17 and George Turner Nos. 8, 12, and 14. Thus, two complete 20 acre 5-spot will be obtained with the Wills No. 12 and the Turner No. 19 being the producing wells which will be affected by a 4-way drive. The Wills No. 12 is a typical well in the southern portion of the field which is the less prolific area, and the Turner No. 19 is a typical well in more prolific area which includes the Gentral and northern portions of the field. During the flush production of 1946 the Wills No. 12 and the Turner No. 19 produced 7 and 13 barrels per day respectively. At the present time these two wells each produce approximately 3 barrels per day.

The current gas injection program should be continued during either pilot of complete flooding as long as there is gas available.

RECOMMENDED PILOT FLOOD PROGRAM (Cont'd)

A reasonably long pilot injection period can be expected due to the wide spacing recommended. We estimate that a maximum injection period of one year will be necessary before a production increase will be noted. This estimation is based on the assumption that an injection rate of 1000 barrels per day is maintained during the pilot flood. If an increase in production does come relatively late, it will be a good indication that channeling will not be excessive.



WATER FLOOD FACILITIES

It is quite probable that an open injection system will be necessary due to the high concentration of hydrogen sulphide which is commonly found in the 900 foot lime in this area. The cost estimate and plant design in this report are for an open system.

to a capacity sufficient for fieldwide flooding will be possible with a minimum of additions and alterations. It will be necessary to install additional water pumping, filtering, and storage capacity for plant expansion, but the basic plant layout will remain the same. The high pressure water mains extending northeast and southwest from the plant will remain the same. The injection lines should be cement lined seamless pipe and the water return lines should be cement lined or plastic pipe. The proposed location of these lines are shown on the field map. Water return lines will not be necessary in the pilot flood and therefore were not included in the pilot flood cost estimate.

It will be advantageous to operate the water source well or wells on electric power and the high pressure pumpoing equipment with gas power. Gas power gives greater flexibility which is needed to regulate the injection rate but is



WATER FLOOD FACILITIES (Cont'd)

not greatly needed in the source well power when using an open system. The long range, overall economy of the two power sources do not differ greatly.

Heater gun barrels will eventually be needed on all batteries if water flooding is found to be practical. These heaters may be of the atmospheric-type except on the Wills et al south battery. This battery should be equipped with a pressure-type heater because the elevation is too low for produced water to flow by gravity to the injection plant.

The converted water input wells should each be capable of taking approximately 150 barrels per day without exceeding the breakdown pressure of the formation. Therefore, the pilot injection plant is designed with a capacity of 1000 barrels per day and full scale plant should have a capacity of approximately 3500 barrels per day.

A general diagram of the pilot water injection plant is included in this report.



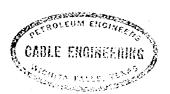
CONVERSION OF PRODUCING WELLS TO INPUT WELLS

After rods and tubing have been removed from the wells being converted, the wells should be cleaned out as well as possible. Each input well should be gravel packed from bottom to a heighth of about 10 feet into the easing to prevent exposed shale from heaving into the well. Well washed, coarse gravel (1/2-inch) should be placed opposite the sand filling the shot hole and well washed, medium sized (1/4-inch) gravel should be used to cover the exposed shale. To assure that the proper amount of each size gravel is placed in the well, a baler should be run to bottom periodically during the gravel packing operation to determine the heighth to which the hole is being filled. Gravel should stand about 10 feet into the casing, but excess gravel will cause excessive flow friction.

COMPLETION OF SOURCE WELLS

One well completed in the 900-foot limestone should provide ample water for the pilot flood operation. The top of the lime section should be cored to determine the presence of oil saturation. Any non-commercial oil production with the flood water would be most troublesome and should be cased off.

The Turner No. 5 well which was dry in the Yates, but has casing set at 710 feet. This well may be deepened to the



COMPLETION OF SOURCE WELLS (Cont'd)

water bearing strata and completed with a liner cemented from 710 feet to bottom. A liner will reduce the turbidity of the water and will eliminate oil production from the Yates or the 900-foot lime.

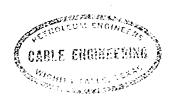
The well should be treated with 1000 to 2000 gallons of acid depending on the thickness penetrated and the natural productivity of the well. The well should be swabbed for several hours after completion to determine its producing capacity prior to selecting pumping equipment.

Other dry holes having casing set are the Wills et al No. 9 and the Crosby No. 3 which may also be recompleted as water producing wells later if needed.

The Turner No. 5 should be recompleted as a water source well as the initial step in the proposed pilot flood program. This is necessary as an analysis of the water is necessary before construction of the water plant can be begun.

REMEDIAL WORK ON PRODUCING WELLS

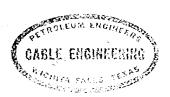
After water production becomes significant, some trouble may occur from caving due to the interval of exposed shale between the casing shoe and the top of the sand. If this occurs, it may be necessary to set liners



REMEDIAL WORK ON PRODUCING WELLS (Cont'd)

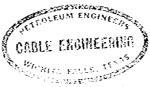
in producing wells where this trouble is excessive.

Producing wells to be converted to input wells should
be gravel packed through the exposed shale section.



FACILITIES AND COST ESTIMATE FOR PILOT FLOOD

FACILITIES AND GOOD	
6 - Input wells cleaned out and gravel packed,	1,800.00
1 - Water source well recompleted in 750-1000 foot seasonne and equipped to pump 750-1000	9,250.00
parreis on and 25 HP multiple	2,400.00
barrels of water por barrels o	
cylinder engine record tank equipped with	1,551.00
1 - 500-barrel hoops galvanized hoops	
Redwood tank equipped tank	940.00
1 - 250-parred hoops galvanized hoops 2 - Concrete tank foundation blocks @ 150.00	300.00
constant foundation blocks c	
2 - Concrete tank foundation 2 - Concrete tank foundation 1 - Water filter, 6' x 5', packed with anthrafilt 1 - Water filtering sand	650.00
or filtering sand	_
or 122 motor and electric motor	° 565.00
1 - Centrifugal backwash purposed and electric motor,	
Joo san and electric motor,	325.00
300 gal per minute capacity 1 - Centrifugal pickup pump and electric motor, 150 gal per minute capacity	300.00
1)0 60- 1	— « ,
1 - Dry chemical feeder	100.00
151 % 10' 2"	250.00
1 - Wooden aereation pit, 150' x 150' x 10' Earthen aereation pit, 150' x 150' x 10'	
Earthen aereachon partines	1,650.00
High pressure injection lines	
Well-head equipment for six input wells	960.00
Well-head equipment for six impages including meters, valves and gages	1,00.00
@ 160.00/well	400,000
@ 160.00/well Miscellaneous valves and connections	1,000.00
Lebor	1.800.00
Engineering and contingencies	\$ 54,841.00
OF ENGLY ENG	



FACILITIES AND COST ESTIMATE FOR FLOOD EXPANSION

FACILITIES AND COST DESCRIPTION	
14 - Additional input wells cleaned out and gravel packed @ 300.00 each	4,200.00
2 - Additional water source wells recompleted in the 900-foot limestone and equipped to pump 750-1000 barrels of water per day, @ 9,250.00 each	18,500.00
1 - Aldrich direct flow 3" x 21" triplex plunger pump, equipped with porcelain plungers, and Insuroch valves	3,900.00
1 - 50 HP 3-phase electric motor, reduced voltage starting box, and water level pilot circuit	1,850.00
1 - 500-barrel Redwood tank equipped with galvanized hoops	1,551.00
1 - 250-barrel Redwood tank equipped with galvanized hoops	940.00
2 - Concrete tank foundation blocks @ 150.00	300.00
2 - Water filters, 6' x 5' packed with anthrafilt or filtering sand @ 650.00	1,300.00
Additional high pressure injection lines	4,450.00
Water return lines,	4,000.00
Well-head equipment for 14 additional input wells @ 160.00/well	2,240.00
Additional valves and connections	1,000.00
1 - Pressure-type oil treater for Wills South Battery	2,500.00
4 - Atmospheric type oil treaters @ 2,000.00	8,000.00
Additional Labor	1,500.00
Engineering and contingencies	3.000.00 \$ 59,231.00
Cost of Pilot Flood	24,241,00 8 83,472,00
Cost of Complete Flood	T CON TO CO

CABLE ENGINEERING

PRODUCED WATER ANALYSIS FRO	M CROSBY LEASES	
PRODUCED WAS 3	Turbidity	SO bbm
8.6	Alkalinity M	3580 ppm 8

as CaCO3 100 ppm as CaC03 7000 ppm as CaC03 5 ppm as Fe 10 ppm as S102 pH Value 7000 ppm as re 5 ppm as re 3037 ppm as H28 Hardness, Soda Alkalinity P Total Iron Hardness, Soap Soluble Iron Soluble Silicia Hydrogen Sulfide 0 ppm as 0 39130 ppm Dissolved Oxygen O ppm as CO2 Total Solids Free Carbon Dioxide 39110 ppm Dissolved Solids

Calcium Carbonate Stability

3220 ppm CaCO3 at pH 9.9 3580 ppm CaCO3 at pH 8.6 360 ppm Requirement Content Super Sat. PRINCIPAL CONSTITUENTS

Ionic

635.44

CHTCTAM	as CaCO3 as CaCO3	4800 2200 200	(+) 01 96.00 44.00	om (e)	1920 1 537	bbm bbm	as Ca as Mg	
Magnesium Hydroxide Carbonate Bicarbonates Sulfate Chloride	as CaCO3 as CaCO3 as CaCO3 as SO4 as C1	100* 3580 3283 17600	1495 . 14 ¹ 4 236 luli	71.60 68.40 495.44	3283	ppm	as SO)4 L

HYPOTHETICAL COMBINATION 0 Barium

as Na

*All Carbonates converted to Bicarbonates in hypothetical combinations.

Sodium & Potessium

5799.6 ppm 1739.2 ppm 2648.8 ppm Calcium Bicarbonate Calcium Sulfate Magnesium Sulfate 28983.0 ppm Sodium Chloride

CORE ANALYSIS SERVICE WICHITA FALLS. TEXAS

	COMPANY: NOTE IN			ALLS, T	EXAS
	GENERAL DATA:	Et Al	26		(March 15, 1951)
	CORED FROM	. شرو			, -,,,,,
- 1	RECOVERED	824	то	844	20 FEET
- 1	ZONE ANALYZED	824	το	844	18 FEET
	OIL BEARING			V 1-4	20 Am Samples
	OIL BEARING & HORIZONTA	LLY PERMEA	BLE	-	20 FEET
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ı	- Landing of A				6.8
-	AVERAGE POROSITY		-		6-8 VERTICAL-MILLIDARCYS HORIZONTAL-MILLIDARCYS
- 1	PRODUCTIVE FORMATION CAP				19.7 PER CENT
	FORMATION VOLUME FACTOR				610 MILLIDARCY-FEET
-	RESERVOIR GAGO		stimate.	i)	1.15
A	RESERVOIR GAS-OIL RATIO (C. VERAGE SATURATION:	alculated & Th	eoretica	al) (1)	CU. FT./BBL.
İ	RESIDUAL OIL				
	CONNATE WATER			*	28.4 % OF PORE SPACE
	TOTAL WATER	*			47.4 % OF PORE SPACE
	OIL IN PLACE	į			47.4 % OF PORE SPACE
AVE	RAGE RECOVERABLE OIL:		er e		705 BBLS. /ACRE FOOT
1	NORMAL RECOVERY (Gas France)			* #	
	ADDITIONAL RECOVERY BY WATER	on) (2)			140 BBLS. /ACRE FOOT
	GAS & WATER DRIVE PERSON	Complete) (8)			BBLS. /ACRE FOOT
	SPECIFIC PRODUCTIVITY INDEX	(8)			BBLS. /ACRE FOOT
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COMPANY: WELL:

ZONE:

Neil H. Wills Et Al Government Lease No. 26 824 To 844

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POLICY: Core Analysis Service assumes no responsibility as to any predictions or dark other than representing the best judgment of this organization. All observations and data secured shall remain the exclusive and confidential property of the client.





ENERGY AND MINERALS DEPARTMENT OIL CONSERVATION DIVISION

BRUCE KING GOVERNOR LARRY KEHOE SECRETARY

April 12, 1982

POST OFFICE BOX 2088 STATE LAND OFFICE BUILDING SANTA FE, NEW MEXICO 87501 (505) 827-2434

Barber Oil, Inc. 111 West Mermod P.O. Box 1658 Carlsbad, NM 88220

ATTENTION: Michael D. Garringer

Case No 469

RE: Exception to Rule 705-A for Injection Wells

Dear Sir:

Pursuant to Barber Oil, Inc.'s request for exception of thirty-seven (37) injection wells, as listed on TABLE I, from Rule 705-A, the Oil Conservation Division (OCD) hereby denies your request.

Review of your application and history thereof by the Santa Fe and Aztec District offices concludes that you have not demonstrated good cause to be entitled to

The OCD requests that Barber Oil, Inc., take appropriate actions as outlined in the OCD Memorandum of September 30, 1981. (See Attachment)

If you have any questions regarding this matter, please do not hesitate to call or contact Oscar Simpson, at (505) 827-2534.

Sincerely,

Joe D. Remey Division Director

JDR/OS/dp

Enc.

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1. Crosby Pederal	Wells #1,	Section	n 12, Townshi	D 20 South	. Panas or	
2.	# 2				, range 28	, East
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4. Turner Federal :						
4. Turner Federal 1	Wells \$2,	Section	13, Townshi	20 South	Range 28	East.
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6.	#6					
7.	#12			•	嘌	
8.	#13			•		
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10.	#18	•		•		
n.	#21				_	
12.	#22	12	,			
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15.	# 5	•	•	•	•	
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STATE OF NEW MEXICO ENERGY AND MINERALS DEPARTMENT OIL CONSERVATION DIVISION

BRUCE KING GOVERNOR LARRY KEHOE SECRETARY

POST OFFICE BOX 2088 STATE LAND OFFICE BUILDING SANTA FE. NEW MEXICO 87501 ISOSI 827-2434

MEMORANDUM

TO:

ALL NEW MEXICO INJECTION WELL OPERATORS

FROM:

JOE D. RAMEY, DIRECTOR

SUBJECT:

TEMPORARY ABANDONMENT OF INJECTION WELLS

Division Rule 705A provides in part that "no injection well may be temporarily abandoned for more than six months unless the injection interval has been isolated by use of cement or a bridge olug." The Division Director may delay the cement or bridge plug requirement upon a request by the operator and a showing that such well is mechanically sound, that there is a continuing need for the well, and that the well constitutes no threat to underground sources of drinking water.

Division survey programs have found several hundred injection wells which have not been used for at least six months and which do not have the requisite plugs. Based upon these surveys the Division will be moving to enforce Rule 705A in the near future.

Operators should review the status of their injection wells and within the next six months take one of the following actions relative to injection wells which have been shut in for six months or longer:

- (1) Return the well to active operation.
- (2) Plug and abandon the well or place a cement or bridge plug above the injection interval.
- (3) File a workover or plugging plan and schedule with the appropriate Division district office.
- (4) File a request for exception to Rule 705A with the Division Director in Santa Fe.

September 30, 1981 fd/

BARBER OIL, INC.

111 West Mermod
Post Office Box 1658
CARLSBAD, NEW MEXICO 88220
(505) 887-2566

April 1, 1982

APR 05 1982

OIL CONSERVATION DIVISION SANTA FE

State of New Mexico Energy and Minerals Department Oil Conservation Division P. O. Box 2088 Santa Fe, NM 87501

Attn: Oscar Simpson III

Water Resource Specialist

Re: Exception to Rule 705-A

LC-050797, Crosby-Turner-Wills Comm. Btry Russell Field Waterflood, Eddy Co., NM

Dear Sir:

As per your letter of March 24, 1982 I hereby submit "Injection Well Data Sheets" on all wells listed in our letter of March 4, 1982 with one exception. Wills #29 is currently "Plugged & Abandoned".

The "Injection Well Data Sheets" should complete your information for sub-paragraphs (a) thru (j). Sub-paragraph (m) is not applicable and (k) & (1) are as follows:

- (k) All of the injection wells were temporarily discontinued during the months of May and June, 1980.
- (1) Injection will resume as soon as a tertiary recovery program is economically feasible.

Again, I must point out that no drinking water sources are located in this area and we consider the wells essential to our future tertiary recovery program.

Very truly yours,

BARBER OIL, INC.

Michael D Garringer

Manager

Enc1: 37

BARBER OIL, INC.

111 West Mermod Post Office Box 1658 CARLSBAD, NEW MEXICO 88220 (505) 887-2566

March 4, 1982

New Mexico Oil Conservation Division Energy & Minerals Department P. O. Box 2088 Santa Fe, NM 87501

Attn: Joe D. Ramey

Re: Federal Oil & Gas Lease LC-050797 - Russell Pool Eddy County, New Mexico Sec. 12, T20S, R28E N.M.P.M.

Gentlemen:

Under your Memo of September 30, 1981 as provided under Division Rule 705A whereby no injection well may be temporarily abandoned for more than six months; this company hereby requests an exception to Rule 705A on the following wells:

Under Crosby Federal - Well Nos. 1,2, &4
Under Turner Federal - Well Nos. 2,3,6,12,13,15,18,21, & 22
Under Wills Federal - Well Nos. 2,5,6,8,10,14,15,17,18,19,21,23,25,26,27,29,
30,33,34,35,36,37,39,41,42, & 45

The above wells are considered to be viable injection wells, not taking water at this time, yet valuble to a tertiary recovery program in the not to distant future. We feel these wells in no way damage the underground sources of drinking water as there is no drinking water in this interval in this area.

I enclose a copy of a letter from our consulting engineering firm, Stephens Engineering, under the signature of Joe L. Johnson, Jr. where he supports this request.

As captioned above this is a Federal oil & gas lease and comes under your jurisdiction through a ruling in the Federal Register/Vol. 47, No. 25/Friday, February 5, 1982/40CFR Part 123 and made effective that same date.

We would appreciate the GCD a deparrence with our request to retain these wells for a future redovery program.

Very truly yours,

9 1982

ONSERVATION DIVISION

SANTA FE

CC: George H. Hunker, Jr.
Michael Stubblefield, OCD-Artesia

Joe L. Johnson, Jr.

Robert S. Ligh

Encl: 1

9 1982

TELEPHONE - 817-723-2166



POST OFFICE BOX-2249

WICHITA FALLS, TEXAS

December 30, 1981

CONFLANT Oil, Inc. P. O. Box 1658 Carlsbad, New Mexico 88220

Attn: Mr. Bob Light

Re: Injection Well Status Barber Oil, Inc. Russell Pool Project Eddy County, New Mexico

Dear Mr. Light:

Reference is made to our conversation concerning the necessity to plug and abandon several of the inactive injection wells in the Barber Oil, Inc., Russell Pool Water Flood, Eddy County, New Mexico.

It is our understanding that the State of New Mexico requires that an injection well be plugged after a six month shutin period. There are also other means in which the well can be maintained, these include returning the well to active operation, filing a workover or plugging plan, and/or filing a request for an exception to Rule 705A with the Division Director in Santa Fe.

We are of the opinion that this project is a prime prospect for tertiary development in the not too distant future. Its shallow depth and remaining oil in place are extremely important in the use of this anticipated process. In view of this, it is extremely important that all wells be maintained and not plugged and abandoned since this would require a rather large expenditure in redrilling should such a process be undertaken in the future. For these reasons, we are of the opinion that a request for an exception to Rule 705A be filed with the Division Director in Santa Fe at the earliest possible date. We remain of the opinion that this project would be an excellent prospect for tertiary development but feel that the loss of any well in the project

area would make the installation of a tertiary project more difficult and therefore possibly force a long delay period for the installation of such a project.

Should there be any questions, please do not hesitate to contact us.

Yours very truly,

STEPHENS ENGINEERING

Joe L Johnson,

JLJjr/dk

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INJECTION WELL DATA SHEET Schematic Tabular Data Surface Casing Size _____sx. TOC _____ feet determined by ____ Hole size Intermediate Casing Cemented with _____sx. 7" CASEIYA TOC _____ feet determined by _____ Hole size 23% TUBING Long string 7 " Cemented with _____sx. TOC LUKNOWN feet determined by Hole size 8" Total depth 726 Injection interval 812 feet to 827
(perfected or open-hole, indicate which) - 726 FORMPETEDY PACKER - 735 - 838' TD 3% lined with CEMENT (material) Tubing size Z"X7" packer at ____ (brand and model) 735 (or describe any other casing-tubing seal). Other Data 1. Name of the injection formation (ATES 2. Name of Field or Pool (if applicable) Russeu 3. Is this a new well drilled for injection? / Yes <u>∕</u>X7 No If no, for what purpose was the well originally drilled? Production 4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) NO

5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in

this area. NONE

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ubing s ize	lir	ned with(n	sterial)	set in a
(b)	and and model)	packe	r at	feet
. ***	e any other casing-tubi	ing seal).		•
ther Data		. 1		
. Name of	the injection formation	on <u>YATES</u>		
	f Field or Pool (if app)			
	s a new well drilled for		Ø No	
If no,	for what purpose was th	he well originally, dril	led? TKONUCTION	
. Has the	e well ever been perfora ve plugging detail (sack	ated in any other zone(ks of cement or bridge	s)? List all such perf plug(s) used)	orated interv

THIRCTION WELL DATA SHEET

HELL NO.	FUOTAGE LOCATION	SECTION	JOS TUNNSITEP	RANGE.
Sche	matic		obular Data	
		Surface Cosing		
řís.	ars.	Size	" Cemented wit	h sx
	₩ . 1. 1. 1. 1. 1.	TOC		
		Hole size		
	12	Intermediate Casing		·
		Size		-
•	Value Services Services			
		TOC	•	
		Hole size		₹1
2		Long string		
Kalabathan sakata	Annual Comments	Size	" Cemonted wit	h <u>100</u> s
	, SO	100 MUKHOWN	feet determined by	***
	7" CHIENO	Hole size 8"		
		Total depth	38'	-
		Injection interval		
		•	. 845	feet
		Iperference or open-ho	ole, indicate which	
<u> </u>				
	732'			W.1
.			•	N. C.
				er a. Er a a.
	TD 845'		en e	
₹;	113 0 10		The Wale	
		•	•	· ·
			*"	
lubing size	line	d with	4	set in a
doing size	Z Z FFT	(mate	riel)	
(bri	and and model)	packer a	it	feet
	e any other casing-tubir	ng seel).		•
ther Data				
l. Name of	the injection formation	YATES	:	
	Field or Pool (if appli	¬		
	a new well drilled for		汉 No	11
		well originally drilled		
	- pp			
t. Has the	well ever been perforate plugging detail (sacks	ted in any other zone(s)? s of cement or bridge plo	List all such per g(s) used) No	forated interva

12 236	021 FSL AND 0339	FW 13		DS OWNSHIP	28 E
IELL NO. FO	OTAGE LOCATION	SECTION		OWNSILLA	RANGE .
	•			• ••••••••••••••••••••••••••••••••••••	
Schematic	• •		Tobular	Data	
		Surface Casing	P2	- - -	
. 4		Size	H	Cemented with	• 1
		TOC	-		
		Hole size		_	
		HO16 2756			
		Intermediate Casi	រាត្	garage and see	**************************************
		Size	. *	Cèmented with	8
	42	TOC	feet d	etermined by	
		Hole size	n en		
		l ann atainn	•		
		Long string	7	~	
	- 10	Size 42"+	*		
	7" CASTAL	TOC LUKNOCON		stermined by _	
		Hôle size	<u>8" .</u>		•
	Ale" CASTAL	Total depth	<u> 765'</u>		
	40	Injection interva	1	-	
			*	50	
	in the second se	100 10 per 100	en-hole, inc	licate which)	feet
	-765'			\$	
	(60)			<u>-</u> •••	
					
	850' 70				
		•		er 🔾	
•					
ubing size	line	l with			set in a
			(material)		
(brand ar	nd model)	pac pac	ker at		feet
	other casing-tubing	seal).		' &	•
ther Data					e.
	injection formation	YATES			
	d or Pool (if appli	\			
		Strate in the Control of the Control	, , , , , , , , , , , , , , , , , , ,		
	w well drilled for			*	
If no, for wh	hat purpose was the	well originally dr	illed?TRO	COSTROLICE	·
					:
. Has the well	ever been perforate	ed in any other zon	c(s)? List	all such perfo	orated interval
and give plue	gging detail (sacks	or cement or bridg	e hrod(a) na	en) 100	
	4				

13 332' FNL AND HELL NO. FOOTAGE LOCATIO	2340 FWL SECT	3 Ton	TUWNSIII P	<u>∂</u> ∂∂ <u>₽</u> RANGE
Schematic		Tabula	Data	
	Surface Cas	ing		
ín e e	Size	. 11	Cemented with _	8 x .
	TOC	feet	determined by	
	Hole size			
	Intermediat	e Casing	× *	
	Size	**	Cemented with _	5)
	•		determined by	
	Hole size			
	Long string		•	
			Cemanted with _	
7" CASSIA	no Toc Noky		determined by	
11.00		8"		•
	•	745'	· · · ·	•
a de to	Injection i		al Colored Law	
	BOS (parties)	feat to or open-hole, i	ndicate which)	feet
74	5 '		,	
		•	•	
FORME	ATTON EA.	•		
THO	- 800'	•		
				a e a
	•			
The state of the s	850' 10			
Tubing size 238"	lined with	CEMENT		set in a
LYNES Z"X 4		(material) packer at	800	feet.
(brand and model) (or desc+ be any other casing				•
Other Data	y-tubing seary.	•		
l. Name of the injection for	mation YATES			·
2. Name of Field or Pool (if	•	SE (L		
3. Is this a new well drille	ed for injection? <u>/</u>	7 Yes /X	No	
If no, for what purpose w	vas the well origina	lly, drilled?	Reprosessor	
	·			
4. Has the well ever been po and give plugging detail	erforated in any oth (sacks of coment or	er zone(s)? Lis bridge plug(s)	t all such perfoused) _NO	rated interval
2 6				4.

		<u>(C. 050131</u>		
IS IELL NO.	FUOTAGE LOCATION	LA FLUC 13 SECTION	TUNNSTILL	78 E RANGE
Sah -				
Sche	matic		obular Data	•
		Surface Casing		
		Size		
		TOC		у
	0 80 9a	Hole size		
2012		Intermediate Casing	•	- -
		Size	* Cemented wi	ths
		TOC	feet determined b	у
A Laboratory	See Enver	Hole size	********	
		Long string		
ि	7" CASSING	Size 7	" Cemonted wi	th 75 .
		TOC UNKAHON		
2.5		Hole size 8"		
		Total depth		
A Company of the Comp	Activities of	•	19	
		Injection interval		
To the second		(8) feet	to <u>808</u> ole, indicate whic	feet
				•
			- 	•
	195			
}				
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	(1) (3)		*	•
ì				F
<u>r</u> -		4		
ubing size	1:	ined with(mat	erial)	set in a
		packer		feet.
	and and model) e any other casing-tul	bing seal).		en e
ther Data	water recording was	•		
	the injection format	ion TATES		
		plicable) Russfu		
•		or injection? /// Yes	/又 No	: :
		the well originally, drille		<u> </u>
4 i 110 ș	TOT HINGE PULPOGE MOS	eveganuaej, vasase		
	uall avan baan manfa	rated in any other zone(s)	? List all such o	erforated interva
4. Has the and giv	e plugging detail (sa	cks of cement or bridge pl	ug(a) used) No	

18	DR. Toll		ω ή ς.	28E
ELL NO.	FUOTAGE LOCATION	93.74, EMC 2ECATION	TOWNSTILE	RANGE
Schen	natic		Tobular Data	
4		Surface Casing	** The second se	
V ā	5.	Size	Cemented with	thsx.
1		•	feet determined by	
		Hole size		
2.5		Intermediate Casing		
		Size	Cemented wit	:hsı
	**************************************	TOC	feet determined by	
	[6]	Hole size		-
	7" CASING	Long string		
The state of the s	() post of the control of the contro	Size	Cemented wit	h 75 s
e e e		TOC UNKNOWN	_ feet determined by	
		Hole size 8		
Programme and the state of the		Total depth	734'	
		Injection interval		
and a		799 feet	to 829	feet
	A Property of the Control of the Con	Approve sed of open-	nois, indicate which	·
•				
	734'			
-				
		•		
				<i>,</i>
. !		b 830 ¹		
•		•	•	-
-		:		
•		. •		
ubing size		lined with(ms	terial)	set in a
\$ X.	nd and model)			feet.
	any other casing-t			• · · · · · · · · · · · · · · · · · · ·
ther Data				
. Name of	the injection forma	tion YATES		
. Name of	Field or Pool (if a	pplicable) RUSSELL		
. Is this	a new well drilled	for injection? /7 Yes	Ø No ∖	
If no, i	for what purpose was	the well originally drill	ed? PRODUCTION	
. Has the	well ever been perf	orated in any other zone(s acks of cement or bridge p	a)? List all such pe	rforated interval
ena give	, proggany accors (o		- January	
		} \$.0		

TIP TO THE

Schematic Surface Cosing Size	21 9591 FSL 2336 ELL NO. FOOTAGE LOCATION	TELX 13		TOWNSHIP	28 E RANGE
Surface Cosing Size	Schematic		Tabular	Data	
TOC		Surfoce Casing		<u>.</u>	*
whing size 1 ined with RASTEC set in a set	to so do Ca	Size	H	Cemented with	8 X
Intermediate Casing Size		TOC	feet	determined by	
Size		Hole size		· · · · · · · · · · · · · · · · · · ·	
whing size 1 ined with 100 reet determined by Hole size 100 (INKANA) feet determined by Hole size 8" Total depth (200) Injection interval Injection interval Total depth (200) Injection interval Injection		Intermediate Ca	sing		
Hole size Constitute Const	The second secon	Size	**	Cemented with	
Size 4/2 + 7 * Cemonted with 10S TOC (UNKNOWN) feet determined by Hole size 8" Total depth (28%) Injection interval T89 feet to 8/9 (partial) PRACE TOO' T	· Control of the cont	тос	feet	determined by	-
Size 4/2 + 7 " Cemonted with 105 TOC (UNKNOWN) feet determined by Hale size 8" Total depth (84) Injection interval 789 feet to 819 Francisco or open-hole, indicate which) Recompton of the injection Recompton of the injection or open-hole, indicate which) Recompton or open-hole, indicate which) Recompton of the injection Recompton of the injection Recompton or open-hole, indicate which) Recom		Hole size			
Size 4/2 + 7 * Cemonted with 105 TOC (INKANUAL) feet determined by Hole size 5" Total depth (84) Injection interval 789	211 025766	Long string			
whing size 2 ined with PLASTIC set in a		Size Alz	+ 7 "	.Cemonted with	
Total depth		TOC WKNO	10 feet	determined by	
Ubing size 28 lined with PASTEC set in a feet. (brand and model) or describe any other casing-tubing seal). Record or open-hole, indicate which) Formation (SC) TO 835' Ubing size 28 lined with PASTEC set in a feet. (brand and model) or describe any other casing-tubing seal). Record or open-hole, indicate which) Formation (material) packer at 750 feet. Feet. Pastec at 750 feet. Ither Dots Name of the injection formation Yates Name of field or Pool (if applicable) Russell I sthis a new well drilled for injection? 77 Yes 77 No If no, for what purpose was the well originally drilled? RONICTION Has the well ever been perforated in any other zone(s)? List all such perforated inter-	A's Course	Hole size	8"		•
To describe any other casing-tubing seal). The Data It was now well drilled for injection? The Data It was the well ever been perforated in any other zone(s)? List all such perforated inter- Test to Start t	A CONTRACTOR OF THE PROPERTY O	Total depth	<u> </u>		
Typing size 28 lined with PLASTIC set in a set i	2% TUBLING	Injection inter	val	•	
Typing size 28 lined with PLASTIC set in a set i		789	feet to	819	feet
ubing size 28 lined with PLASTIC set in a APPOLL THE St. 2" X A" packer at 750 feet. (brand and model) or describe any other casing-tubing seal). When of the injection formation YARS Name of Field or Pool (if applicable) RUSSELL Is this a new well drilled for injection? 7 Yes X No If no, for what purpose was the well originally drilled? POLLATION Has the well ever been perforated in any other zone(s)? List all such perforated inter-		(paradour or	open-noie, ii	idicate which)	f -
Franktion Species To 838' To 838' To 838' To 838' Affine The St. Z" X 4" (material) packer at 750 feet. Or describe any other casing-tubing seal). Other Dota I. Name of the injection formation YATES I. Name of Field or Pool (if applicable) Russell I. Is this a new well drilled for injection? The Year To No If no, for what purpose was the well originally drilled? PONICTION Has the well ever been perforated in any other zone(s)? List all such perforated interviews.					
Franktion Species To 838' To 838' To 838' To 838' Affine The St. Z" X 4" (material) packer at 750 feet. Or describe any other casing-tubing seal). Other Dota I. Name of the injection formation YATES I. Name of Field or Pool (if applicable) Russell I. Is this a new well drilled for injection? The Year To No If no, for what purpose was the well originally drilled? PONICTION Has the well ever been perforated in any other zone(s)? List all such perforated interviews.	look .			2000 P	*******
Franktion Species To 838' To 838' To 838' To 838' Affine The St. Z" X 4" (material) packer at 750 feet. Or describe any other casing-tubing seal). Other Dota I. Name of the injection formation YATES I. Name of Field or Pool (if applicable) Russell I. Is this a new well drilled for injection? The Year To No If no, for what purpose was the well originally drilled? PONICTION Has the well ever been perforated in any other zone(s)? List all such perforated interviews.					
ubing size 2 1 ined with PLASTIC set in a (material) Allow Wees 2" X 4" packer at 750 feet. (brand and model) or describe any other casing-tubing seal). Ather Data Name of the injection formation YATES Name of Field or Pool (if applicable) RUSSELL Is this a new well drilled for injection? 7 Yes 12 No If no, for what purpose was the well originally drilled? POWETON Has the well ever been perforated in any other zonc(s)? List all such perforated interv	(10)				
ubing size 2 1 ined with PLASTIC set in a (material) Allow Wees 2" X 4" packer at 750 feet. (brand and model) or describe any other casing-tubing seal). Ather Data Name of the injection formation YATES Name of Field or Pool (if applicable) RUSSELL Is this a new well drilled for injection? 7 Yes 12 No If no, for what purpose was the well originally drilled? POWETON Has the well ever been perforated in any other zonc(s)? List all such perforated interv		•			÷ .
To 838' Tubing size 2''' lined with PLASTIC set in a Allow TUPE St. 2" X A" packer at 750 feet. (brand and model) For describe any other casing-tubing seal). Phor Data 1. Name of the injection formation YATES 2. Name of field or Pool (if applicable) RUSSELL 3. Is this a new well drilled for injection? 7 Yes 7 No 11 no, for what purpose was the well originally drilled? PONJECTION Has the well ever been perforated in any other zone(s)? List all such perforated interv	FORMATION				
ubing size 28 lined with RASTAC set in a Alfred TURE St. 2" X 4" packer at 750 feet. (brend and model) or describe any other casing-tubing seal). Other Data Name of the injection formation (ATES) Name of Field or Pool (if applicable) RUSSELL Is this a new well drilled for injection? /7 Yes // No If no, for what purpose was the well originally drilled? ROULTON Has the well ever been perforated in any other zone(s)? List all such perforated interv	750'			:	
ubing size	72 938'			`	-
Affine Type St. 2" X A. packer at					•
ACROSTURES: 2"XA" packer at 750 feet. (brand and model) or describe any other casing-tubing seal). Ither Data Name of the injection formation YARES Name of field or Pool (if applicable) RUSSEU Is this a new well drilled for injection? /7 Yes // No If no, for what purpose was the well originally drilled? PONICTON Has the well ever been perforated in any other zone(s)? List all such perforated interv	4 B		_		
Affine TUPESC 2" X 4" packer at 750 feet. (brand and model) or describe any other casing-tubing seal). (ther Data Name of the injection formation YATES Name of Field or Pool (if applicable) RUSSELL Is this a new well drilled for injection? 77 Yes 77 No If no, for what purpose was the well originally drilled? ROUCTION Has the well ever been perforated in any other zone(s)? List all such perforated interv					set in a
or describe any other casing-tubing seal). ther Data Name of the injection formation			scker at	750	feet
Name of the injection formation	and the control of the first first and the control of the control	ng seal).			
Name of the injection formation	•				
Is this a new well drilled for injection? // Yes // No If no, for what purpose was the well originally drilled? PONCOTION Has the well ever been perforated in any other zone(s)? List all such perforated interv		n YATES			
If no, for what purpose was the well originally drilled?	. Name of Field or Pool (if appl	icoble) Rus	SSELL		
Has the well ever been perforated in any other zone(s)? List all such perforated interv	. Is this a new well drilled for	injection?	Yes ZZ	ło	
Has the well ever been perforated in any other zone(s)? List all such perforated inter- and give plugging detail (sacks of cement or bridge plug(s) used)	If no, for what purpose was th	e well originally	drilled?	SOUCTION	
Has the well ever been perforated in any other zone(s)? List all such perforated inter- and give plugging detail (sacks of cement or bridge plug(s) used)					
	Use the wall ever been nerfore	ted in any other : s of cement or br:	conc(s)? Lis idge plug(s)	t all such peri	Forated interva
	and give plugging detail (sack				
	and give plugging detail (sack				

	OTC. INC.				
DO IELE NO.	POTAGE LOCATION	1669 FEL 13 SECTION	ÁÓS TUNNSI	IIP A	R8E
				•	·
Sche	matic		Tabular Data	. 19	
	•	Surface Casing		•	
		Size	" Cemer	ited with	K.9
		TOC			
		Hole size	······································	·	
		Intermediate Casi	ng	· *,	
	-7" CASING	Size	•	ted with	5
•	1 GHZTING	TOC			
		Hole size	,		
77/4/-0		Long string	; · ·		
		Size	7 " Cemon	ted with	125 .
	JAS TUBING	TOC LINKNOWN			
		Hole size			
Continue		Total depth			
		Injection interva			
				.م د	
		(perferated or op	en-hole, indicat	e which)	et:
• 1					
	742'				
	742'			·	
					and the second second second
•	FORMATION PAR	KEC .			
					•
		•	S.		
	TD 868'		:		
	236"		CHEMENT		
ubing size		ned with	(material)		_ set in a
(bri	32RSQJ ZX	paci	ker at <u>&O</u>	<u>)</u>	feet.
or describe	e any other casing-tub	ing seal).			•
ther Data					
	the injection formati			· .	
	Field or Pool (if app				
	a new well drilled for				*
If no,	for what purpose was t	he well originally, dr	illed? TROQUE	TTAL	
	well ever been perfor e plugging detail (sac	ated in any other zone ks of cement or bridge	c(s)? list all : e plug(s) used) _	such perfora	ted interval
. Has the					
. Has the and give					·
. Has the and give					· · · · · · · · · · · · · · · · · · ·

2 660' FSL 660' FULL	/3	20s Tuhnsiilp	28 E RANGE
L NO. FOOTAGE LOCATION	SECTION	TUWNSTILP	RANGE
•			
Schematic .		Tabular Data	
	Surface Casing		
e e e	Size	Cemented w	ith
	TOC	_ feet determined	by
	Hole size		
	Intermediate Casing	*	
State of the state	Size	W Comented w	· · · · · · · · · · · · · · · · · · ·
Programme Control of the Control of	TOC		and the second s
7" CASING	Hole size		
	•		
Committee of the commit	Long string		
23% TUBLEY	Size 7		
	100 UNKNOWN		у
	Hole size		•
	Total depth	154	
Action of the second of the se	Injection interval		
	785 feet	to 809	fest
PACKER	the or open-	nole, indicate whic	:h)
· ి 🚪 స్వామి			
754	· .		
	•		
		en e	
TO 809'	•		
			in e. Se
3.			
ing size <u>98</u> lined		terial)	set in a
LYNES ZX14	packer	at	feet.
(brand and model) describe any other casing-tubing	seal).		
er Data			
Rame of the injection formation	YATES		
Name of Field or Pool (if applic	<u></u>		Part of the second seco
Is this a new well drilled for i		<i>/</i> ∕∕∕⁄⁄ No	
If no, for what purpose was the		_,	1
			-
Has the well ever been perforate	d in any other zone(s)? list all such o	erforated interv
and give plugging detail (sacks	of cement or bridge p	lug(s) used) <u>No</u>	
			-
	137		
Give the depth to and name of an			

<u> </u>	TUDIAGE LOCATION 330'	FUSC 13	2 O.C. Petitsonaut	28E
· · · · · · · · · · · · · · · · · · ·			· · ·	•
Sch	nematic		Tabular Data	en e
	· Section of the sect	Surface Casing		
F/s	e fa		Cemented	withsx.
				d by
		Hole size		
		Intermediate Cas	ion	
The Markey of				withsx
Section of the sectio	7" CASINO			d by
arende Sassa	The state of the s	Hole size	S :	
		•		
		Long string	7	
			feet determined	with <u>125</u> sx
		Hole size		J UY
	JA TUBING		768	 ,
		Injection interve		
		<u>868</u>	eet to 856 en-hole, indicate wh	iich)
			- 	
	768'	- ·		a st
			•	
.	FORMATIO	is PACKER		
	e 800	•		
				*
	TD 85	56'		
•	•		÷	
ŧ.	236"		PEMENT	set in a
bing siz			(material)	36¢ IU 8
\ (b:	THES 2" X 4"4 rand and model)	pac	ker at	feet.
r descri	be any other casing-tubi	ng seal).		
ther Data		,		
	f the injection formatio	~	<u> </u>	:
. Name o	f Field or Pool (if appl	icable) <u>Kussfii</u>		
	s a new well drilled for	<u> </u>		
If no,	for what purpose was th	e well originally, dr	illed? PRODUCTION	
			· · · · · · · · · · · · · · · · · · ·	
. Has th and gi	e well ever been perfora ve plugging detail (sack	ted in any other zon a of cement or bridg	e(s)? List all such e plug(s) used)	perforated intervals
		e e		

		*	(0.050797) TIAST	_		
ELI NO.	ruon	AGE LOCATION	S FW SECTION		OWNSIIIP .	RANGE
		•				
Sche	ematic .			Tobular	<u>Data</u>	
			Surface Casing			
li,			Size			
	C		TOC			
			Hole size	- 		
		Na.	Intermediate Cas			
	1000		Size		_	
			TOC			
		7" CASTNG	Hole size	···		
	· ·	•	Long string			
X.			Size	_7_"	Cemented with	sx
			TOC CINKNOWN		-	
			Hole size			
			Total depth	<u>736'</u>		
			Injection interve	11		
	()		E03	eet to	829	feet
		•	(peo-cases of o	,en-11018, 111	dicate which	
• 1			;			
53 .	1	736			-	
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	44					
	j		•	•		•
		· · · · · ·		\$		
	1	1D 858'			•	
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				v.t	\$ \$	
	i	•	4.			
ubing size	:	line	d with	·		set in a
	2		200	(material) ker at		feet
the second control of the second	bns bns			.Kei at		
• 4.4	e any of	ther casing-tubin	g seel).			
ther Data			V			
		jection formation		• 1		
Same of			coble) Russe			
•			injection? /// Ye		_	
. Is this	for wha	t purpose was the	well originally, dr		COMON TOWN	·
. Is this			ad in any shan so	10/012 12-4	all such case	rated interval
Is this			eo in Anv Staet 201	icibj: LIST	ari ancli belic	rocen THISLABL
If no,	s well e	ver been perforat ing detail (sacks	of cement or bridge	je plug(s) u	sed) <u>NO</u>	
If no,	s well e ve plugg	ver been perforat ing detail (sacks	of cement or bride	ge plug(s) u	sed) <u>NO</u>	
If no,	s well e ve plugg	ver been perforat ing detail (sacks	of cement or bride	ge plug(s) u	sed) <u>NO</u>	

ELL NO. FOOTAGE LOCATION	SECTION SECTION		41lishwu	RANGE
Schematic		Tobular	Daka	
Windowski and Company and Comp	Surface Casing	1000101	Data .	
fs s	Size	H	Cemented with	. ,
	тос			
	Hold size			
	Intermediate Casi	na	·	
	Size	 '	Cemented with	
•	TOC		•	
7" CHSIAL	Hole size			
CHOLING	Long string			
	Size	7 "	Cemented with	100
	TOC UNKNOWN			
	Hole size		. —	
	Total depth	738'		
	Injection interva	1		
	<u>857</u> r	et to	372 licate which)	feet
	(production or ope	en-hole, ind	licate which)	
728				
738'				under State of the
	n grand to	3		
	·		14	
	•			
77 835	•			. •
100				^
			•	
bing size1	ined with	material)	·	set in a
				feet.
(brand and model) or describe any other casing-tu	bing seal).			
ther Data				:
. Name of the injection format	ion YATES			
Name of Field or Pool (if ap	plicable) <u>Russfu</u>			~~
. Is this a new well drilled f	or injection? <u>/</u> // Yes	/ <u>/</u> / No		•
If no, for what purpose was	the well originally, dri	11ed?	302127202	
			·	
. Has the well ever been perfo and give plugging detail (sa	rated in any other zone cks of cement or bridge	e(s)? List e plug(s) us	all such perfo	rated interv
and dark breddend access the				

reli No.	TOOTAGE LOCAT	10N 100ミ	FUL 13 SECTION		205 TUNNSIIIP	28E RANGE	
Schemal	Lie		,	Tabu	lar Data		
			Surface Casing		<u> </u>		
4 %			Size	- H	Cemented with	·	s x
					et determined by		-
			Hole size				
							
	- 33		Intermediate C				
	7" CKSIN	<i>(</i> .			Cemented with		
		•			et determined by		
			Hole size				
			Long string				
	2% TUBO	عاد	Size	7 *	Cemented with	100	_8>
			TOC UNKNOW	nd fee	t determined by		-
			Hole size				
			Total depth				
		-				2.36	
			Injection inte		000		
		0	(perfered or	reet to open-hole,	indicate which)	_ feet	
	PARKER	હ			•		
	739'	·		•			
			(1) (1) (1) (1) (1) (1) (1) (1) (1) (1)		•		
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	3 07 -	10,				·	
•	d ·						
# # # # # # # # # # # # # # # # # # #	•		•				
		£2					
• ;	£						
. •	23/11						
ubing size	<u>8,8</u>	lined	with	(materia	1)	set in a	
Coutes	and model)	2'x 7"		packer at _	730	feet-	
	ny other casin	g-tubing	seal).			•	
ther Data							
	e injection fo	rmation	YATES		·	×	
			oble) Russ	ELL			_
		and the second	njection? /7	Yes /叉	No ,		
			well originally.		PRODUCTION		
,	package						
Una Sha	11 avan boso o	nrfnra+a	d in any other	2006(8)2	ist all such peri	orated inten	 1 ور
and give p	lugging detail	(sacks	of cement or br	idge plug(s) used) <u>NO</u>	TITUS INCELS	

** KA 105	-	<u>.</u>			^	
ELL NO.	330 FSX	COCATION FE	SECTI	้อก	OOS TOWNSTILE	J8E
		· · · · · · · · · · · · · · · · · · ·			-	•
		•				
Sche	matic .				r Data	•
			Surface Casi			
			Size	11	Cemented with	8 X .
			TOC			
			Hole size _			
	- \		Intermediate	Casing		
	\$4.00 mg	·	Size	***	Cemented with	sx.
	The state of the s		TOC	feet	determined by	
			Hole size			
	S _ 7"	CASTNO	Long string		ing and the second	
		ではないる	Size	7 "	Cemonted with	_12Ssx.
			A		determined by	r
	The second		Hole size <u>j</u>	8'		
E			Total depth	ఓపక		
			Injection in	terval		
			756	feet to	077	feet
			(personal de	or open-hole,	indicate which)	
	The second	•				·
	1	655'				
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		* · · · · · · · · · · · · · · · · · · ·				
					rest	•
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) -	0	-76 775'			-	
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china siss		line	ed with		•	set in a
bing size				(material	<u> </u>	
(br	and and mo	del)		packer at		feet
	e any othe	r casing-tubir	ng seal).			in the second
ther Data			Unam c			· · · · · · · · · · · · · · · · · · ·
		tion formation	~	.67.1		
			icoble) Rus		No.	
			injection? / well original	,		
IT NO,	ior what p	orhose was ty	e wert oridinar	ri, octifed:	Commond.	
Una Ab-	wall aver	hoen perform	ted in any other	r zone(s)? li	st all such ner	forated intervals
. Has the	e plugging	detail (sack	s of cement or	bridge plug(s)	used) No	
· .		······································				
					ng oil or gns zo	

INJECTION WELL DATA SHEET CC-050797 WIRLS FED. · BARRER On INC. 996 FSL AND 330' FEL Tobular Data Schematic Surface Cosing Size _____ M Cemented with _____sx. TOC ______ feet determined by ____ Hole size Intermediate Casing Size _____ " Cemented with ___ TOC _____ feet determined by ___ 7" castal Hole size Long string Size _ _____7 " Cemented with 125 sx. TOC UNKNOWN feet determined by 236" TUBTING Hole size 82" to 754 8" to 754 to 784 Total depth ______ (c/c2 Injection interval 764 feet to 784 feet - G62' POCINATION PARKER @ 7501 -TD 790 lined with CEMENI (material) packer at 750 (or describe any other casing-tubing seal). Other Data 2. Name of Field or Pool (if applicable) * CUSSEU 3. Is this a new well drilled for injection? / Yes If no, for what purpose was the well originally drilled? PRODUCTION 4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (aacks of cement or bridge plug(s) used) $\frac{100}{100}$

Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in

ELL NU.	FUOTAGE LOCATION	SECTION	TOWNSIITP	DS E
Scher	natic _	1	Tabular Data	
		Surface Casing		
•		Size	" Cemented with	8x.
		14.2	feet determined by _	
		Hole size		
	भू - स्वत्यात्वात्वात्वात्वात्वात्वात्वात्वात्वात्व	Intermediate Casing	•	
		Size	Cemented with	5 X
		TOC	feet determined by _	·
		Hole size	2	•
	7" CASTAL	Long string		
			" Cemonted with	
		9	feet determined by	
		Hole size 8^{t} Total depth(•
	A Company of the Comp			
-		Injection interval	r. Com	
		Land or open-h	to <u>800</u> ole, indicate which)	feet
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		en gerker en en en en en en en en en en en en en		
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bing size	line	ed with(mat	erial)	set in a
(bra	nd and model)	packer	at	feet
r describe	any other casing-tubin	ng seal).	ŷ.	•
her Data		YATEC		
	the injection formation Field or Pool (if appl	~		
	a new well drilled for		/X/ No	
	•	well originally drille		
V				
. Kas the	well ever been perfora	ted in any other zone(s) s of cement or bridge pl	? List all such perfo	orated interval
500 947C	- Frankling Toolie (one)			

, s - v ·

		(C-DSO79) LEAST FELL SECTION)& € NGE
Schematic	•		Tabular Data		
		Surface Casing			
1 9 (9		Size	H Cemer	ited with	8 x .
		TOC	feet determ	ined by	
		Hole size		· · · · · · · · · · · · · · · · · · ·	
		Intermediate Casi	<u>ng</u>	e e	
		Size	Cemen	ted with	8
		TOC	feet determ	ined by	
	~7" CASTAL	Hole size		·	
	•	Long string			
		Size	* Cemon	ted with	150 81
		TOE WOKNOWN			
		Hole size			•
	· ·	Total depth	670'		
		Injection interva	1		
		767	eet to (8) en-hole, indicate	fee	t .
		(or op	en-hole, indicat	a which)	
- 100 M			a a said a said a said a said a said a said a said a said a said a said a said a said a said a said a said a s		
	G70'	Communication of the Communica			
			-		
	TO 790'	•	Interpretation of the second		
<u>.</u>					
		• ,		· · · · · · · · · · · · · · · · · · ·	
9		4			
	·		•	•	
bing size	lin	ed with	(muterial)		set in a
			ker at		feet
(brand and codescribe any	; model; ;ther-casing-tubl	ng seal).	·		•
ther Data		·		,	
. Name of the in	njection formatio	n <u>237AP</u> n		· .	
. Name of Field	or Pool (if appl	icable) Russe	LC		
. Is this a new	well drilled for	injection? /7 Yes	s 🗷 No	1	
If no, for whi	at purpose was th	e well originally, dr	111ed? <u>Robus</u>	220Y	·

. Has the well and give plug	ever been perfora ging detail (sack	ted in any other zone s of cement or bridge	c(s)? List all s e plug(s) used)	uch perforati	ed interval
3 r - 3	-		· · •		

1.5.4

1.5

Schematic Township RAMCE Schematic Township RAMCE Surface Cosing Size "Cemented with TOC Test determined by Hole size "Cemented with TOC feet determined by Hole size "Cemented with TOC feet determined by Hole size "Cemented with TOC feet determined by Hole size RAMC Tocal depth 770' Injection interval Injection interval Same or open-hole, indicate which) Tocal depth Tocal (a state) Tocal depth Tocal (a state) Tocal depth Tocal depth Tocal (a state) Tocal depth Tocal depth Tocal (a state) Tocal depth Tocal depth Tocal (a state) Tocal depth Tocal depth Tocal (a state) Tocal depth	BARRECE	Ox. Tac	(0-050797	WELLS FED.	
Surface Cosing Size					28E
Surface Cosing Size	4 (10) 10 (10) 10 (10)				•
Size	Sche	ematic		Tobular Data	
whing size			Surface Casing		v*
Intermediate Casing Size			•		
Intermediate Casing Size "Cemented with			TOC	feet determined by	·
Size			Hole size		
Hole size Long string Size T " Cemented with ISO TOC UNKNOWN feet determined by Hole size RIGHT Total depth TTO) Injection interval Rest to S49 Feet t					, '
Hole size Long string Size 7. Cemented with 150 TOC (Liveral) feet determined by Hole size 8/2! Total depth 773 Injection interval 829 feet to 849 Feet (practical) feet (practical) packer at feet (brand and model) or describe any other cosing-tubing seel). ther Dota Name of the injection formation (ANES) Name of field or Pool (If applicable) (Liveral) Is this a new well drilled for injection? [7] Yes [8] No 17 no, for what purpose was the well originally, drilled? (List all such perforated intervent and give plugging detail (sacks of coment or bridge plug(s) used) (10) Give the depth to and name of any overlying and/or underlying oil or gas zones (pools); Give the depth to and name of any overlying and/or underlying oil or gas zones (pools);					
Long string Size	* Annual State of the State of	7" Casing			
Size			Hole size		
Total depth 773' Injection interval Feet to 847 Feet Total depth 773' Injection interval Feet Feet Feet Feet For open-hole, indicate which) Feet					
Hole size					
Total depth					··
Injection interval SSA feet to SSA fe					
TO 880' To exercial packer at feet. To describe any other casing-tubing seal). The TO 10 1					
Interval and model) The Second and model packer at packer at feet. (brand and model) (e e e e e e e e e e e e e e e e e e e	Section 1997			
packer at					
packer at					
packer at		772'			
packer at					
Joing size			2.123	Service of the servic	
packer at			e		•
packer at			·		
packer at		•			
packer at		- 65'	•	•	
(brand and model) packer at	•	1D 890	÷		
(brand and model) packer at					
(brand and model) or describe any other casing-tubing seal). ther Data Name of the injection formation	bing size	line	d with	material)	set in a
ther Data Name of the injection formation (ATES) Name of Field or Pool (if applicable) RUSEU Is this a new well drilled for injection? /7 Yes /X No If no, for what purpose was the well originally drilled? PRODUCTION Has the well ever been perforated in any other zone(s)? List all such perforated intervand give plugging detail (sacks of cement or bridge plug(s) used) Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) is					feet-
Name of the injection formation (ATES) Name of Field or Pool (if applicable) RUSEU Is this a new well drilled for injection? 17 Yes 18 No If no, for what purpose was the well originally drilled? RODUCTION Has the well ever been perforated in any other zone(s)? List all such perforated intervand give plugging detail (sacks of cement or bridge plug(s) used) NO Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) is	and the second	and the second of the control of the	g seal).		• .
Name of Field or Pool (if applicable) FUSEU Is this a new well drilled for injection? /7 Yes /X No If no, for what purpose was the well originally drilled? PRODUCTION Has the well ever been perforated in any other zone(s)? List all such perforated intervand give plugging detail (sacks of cement or bridge plug(s) used) Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) is					• •
Is this a new well drilled for injection? /7 Yes / No If no, for what purpose was the well originally drilled? Production Has the well ever been perforated in any other zone(s)? List all such perforated intervand give plugging detail (sacks of cement or bridge plug(s) used) NO Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) is	. Name of	the injection formation	YATES		
If no, for what purpose was the well originally drilled? RODUCTION Has the well ever been perforated in any other zone(s)? List all such perforated intervand give plugging detail (sacks of cement or bridge plug(s) used) NO Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) is	Name of	Field or Pool (if appli	coble) RUSSELL		
Has the well ever been perforated in any other zone(s)? List all such perforated intervand give plugging detail (sacks of cement or bridge plug(s) used)					· · · · · · · · · · · · · · · · · · ·
and give plugging detail (sacks of cement or bridge plug(s) used) NO. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) is	If no, i	for what purpose was the	well originally, dri	11ed? PRODUCTION	7
. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) i	. Has the	well ever been perforate plugging detail (sacks	ed in any other zone of coment or bridge	e(s)? List all such per plug(s) used) NO	forated interva
. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) i					
thin area. Nows	. Give th	e depth to and name of a	ny overlying and/or	underlying oil or gas z	ones (pools) in

ELL NO.	LOSC' FAIC FUOTAGE LI	ocation	EC SEC	13 Tion	TOWNSHIP	28 E RANGE
<u>Sche</u>	matic	•		Tabul	er Dota	
			Surface Ca	nnie		
12	6		Size	н	Cemented with	8)
					t determined by	
	- 1					_
			Intermedia	te Casine	·	
					Cemented with	· · · · · · · · · · · · · · · · · · ·
					t determined by	
	7"	Castal	HOTE BISE	4-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1		s
			Long strin			
			Size	7"	Cemonted with	<u> \$0</u> s
					t determined by	
			Hole size	8/2"		•
			Total dept	h 7091		
		•	Injection	interval		
			-		848	feet
•			P	or open-hole,	348 indicate which)	. 1681
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ğ	- 12	7291				
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		ಗ್ರಾ 8ಎ'	<i>c.</i>			
		1D 8≥'	· ·			
ubing size		TD 8≤°	1 with			set in a
obing size			i with	(materia	•	set in a
	and and model	lined	j with	(materia packer at		set in a
(bra	and and model	lined		,	•	set in a
(bra or describe ther Data	e any other c	lined	g seal).	packer at		set in a
(bra or describe ther Data . Name of	e any other c	lined) asing-tubing on formation	YATES	packer at		set in a
(bra or describe ther Data . Name of	e any other c	lined) asing-tubing on formation	YATES	packer at		set in afeet
(bra or describe ther Data . Name of . Name of . Is this	the injection Field or Pool	lined) asing-tubing on formation of (if applied	(ATES	packer at	No	set in afeet
(bra or describe ther Data . Name of . Name of . Is this	the injection Field or Pool	lined) asing-tubing on formation of (if applied	(ATES	packer at	No	set in afeet.
(bra or describe ther Data . Name of . Name of . Is this	the injection Field or Pool	lined) asing-tubing on formation of (if applied	(ATES	packer at	No	set in afeet
(brace of describe ther Data and of last his lift no, last the	the injection field or Poor a new well do for what purp	lined asing-tubing on formation (if applied frilled for cose was the	coble)	packer at	No PRODUCTION ist all such perf	feet
(brace of describe ther Data and of last his lift no, last the	the injection field or Poor a new well do for what purp	lined asing-tubing on formation (if applied frilled for cose was the	coble)	packer at	No PRODUCTION ist all such perf	feet
(brace of describe ther Data ther Data this life no, the send give	the injection field or Poor a new well ever been plugging de	lined asing-tubing on formation of (if applied frilled for cose was the cen perforate ctail (sacks	cable)	packer at	No PRODUCTION ist all such perf	orated interva

23 3301 ([[NU. FUOT	FAL AND ILLS' FER AGE LOCATION	SECTION	TUWNSIIIP .	28e RANGE
Schematic		<u> </u>	abular Data	
•	<u>.</u>	Surface Casing		
6 6 6		Size	" Cemented with	
		TOC	feet determined by	
		Hole size		
		Intermediate Casing		• • • • • • • • • • • • • • • • • • •
200	~7" CASING	Size	" Cemented with	S
	Como	TOC	feet determined by	
		Hole size		artini di salah sa
	en en en en en en en en en en en en en e	Long string	,	
		Size	" Cemented with _	180 .
	- 2% TUBING	100 MNKNOWY	feet determined by	,
		Hole size 8/4	2	•
		Total depth	749	
		Injection interval		
		860 feet	to 875	feet
		(parameter or open-h	Die, indicate which)	
				e e
	7491		·	
	~ aua	MIJEN PHONEC		
	195 AS			
				•
	_70 880'	•		• • • •
1	113 000			
				N.C.
ubing size	1ined	(mat)	NENT erial)	set in a
(YNES	Z'X 4'4"	packer	et <u>B50</u>	feet
(020112 0112	ther casing-tubing	seal).	••	•
ther Data				e e e e e e
. Name of the in	jection formation	PATES		
. Name of Field	or Paol (if applica	ible) <u>Russeu</u>	·	
. Is this a new	well drilled for in	njection? // Yes	₩ No	
If no, for wha	t purpose was the i	well originally, drille	45 TRODUCTION	
-				
. Has the well e and give plugg	ver been perforated ing detail (sacks d	d in any other zone(s) of cement or bridge pl	? List all such perfoug(s) used)	rated interval
- · · · · ·	.*			

RAPTER LITE TOO WHITHAIDIN 25 40 FN ma 2000' FN WELL NO. FOOTAGE LOCATION			RANGE
Schematic	Surface Casing	Tabular Data	
%		" Cemented with	· . 8x
	Toc	feet determined by _	
	Hole size		
	Intermediate Casing	1	
		M Comented with	s:
		feet determined by	
65/8" CASTNO	Hole size		•
6.8 CASING	Long string		
	Size65	Cemented with	s×
	* *	feet determined by	
JAZENT & C	Hole size 8"	2"	•
	Total depth	हैं बाद	
	Injection interval		
	<u> </u>	t to 873 -hole, indicate which)	feet
	or open	-noie, indicate which	
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FORMAT	TW 045'	en de la companya de la companya de la companya de la companya de la companya de la companya de la companya de La companya de la co	
PACKES !	& Due		
TD 880'		•	•
		• • • • • • • • • • • • • • • • • • •	
73/			set in a
ubing size lined	(m	aterial)	
(brand and model)	packe	r at <u>845</u>	feet
or describe any other casing-tubing	seal).		•
ther Data	YATES		
. Name of the injection formation . Name of Field or Pool (if applic			
		/⊠ No \	
Is this a new well drilled for i			
ar mat the mine beckered and the			
. Has the well ever been perforate	d in any other zone(s)? List all such perfo	rated interval
and give plugging detail (sacks	of cement or bridge	plug(a) used) <u>RVC</u>	·

INJECTION WELL DATA SHEET 1305' FAL & 1980' FEL Tobular Data Sche: stic Surface Casing Size Cemented with ____sx. TGC _____ feet determined by ____ Hole size Intermediate Casing Cemented with ____sx. TOC _____ feet determined by Hole size JOIZAD "T > Long string 7" Cemented with 100 sx. Size TOC UNKACUN feet determined by Hole size 85" Total depth 823' Injection interval 826 feet to 846 (pasfeeded or open-hole, indicate which) තිබ3් -TD 858 lined with ______(material) __ packer at __ (brand and model) (or describe any other casing-tubing seal). Other Data 1. Name of the injection formation (ATTES 2. Name of Field or Pool (if applicable) RUSSEU 3. Is this a new well drilled for injection? /7 Yes If no, for what purpose was the well originally, drilled? PROCECTION 4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) 5. Give the depth to and name of any overlying and/or underlying ail or gas zones (pools) in this area. NONE

INJECTION WELL DATA SHEET (C-050797 Was FAD Schematic Tabular Data Surface Casing Size _____ " Cemented with _____sx. TOC _____ feet determined by Hole size Intermediate Casing Size " Cemented with sx. feet determined by Hole size 4" casing Long string Cemonted with 450 sx. TOC UNKNOWN __feet determined by _____ Hole size _ 5½" 23/8" TUBENG Total depth 827' Injection interval (perforated or a indicate which) PARKER @ 7801 TO 840' 238 lined with (EMENT (material) (brand and model) (or describe any other casing-tubing seal). Other Data /XT No 3. Is this a new well drilled for injection? /7 Yes If no, for what purpose was the well originally drilled? PRODUCTION 4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used)

5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area.

INJECTION WELL DATA SHEET (C-050797 Wrus Fee Schematic Surface Cosing Size _____" Cemented with TOC _____ feet determined by ____ as'7" Hole size Intermediate Casing \ JT. as conductor 42" CASTAL Cemented with (O _____feet determined by ____ Hole size _____ 8/2" Long string Cemented with ____ \$27 ___ sx. Size 10C 22S' __ feet determined by __TS 64" Hole size Total depth Injection interval 845 7 feet to 864 (perforated or agent hole, indicate which) 8451 Tubing size (material) (brand and model) (or describe any other casing-tubing seal). Other Data 2. Name of Field or Pool (if applicable) RUSSEU 3. Is this a new well drilled for injection? / Yes 双 No. If no, for what purpose was the well originally drilled? Traduction 4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of coment or bridge plug(s) used) 5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area. NODE

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5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in

this area. NONE

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BARRER ETC. TIVE	INJECTION WELL DA	ATA SHEET	
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INJECTION WELL DATA SHEET (c-050797 Walls Fen. Schematic Tobular Data Surface Casing Size ____ " Cemented with ____sx. .7" CASENG TOC _____ feet determined by Hole size Intermediate Casing - الما^ر Size ______ T Cemented with __ IS __sx. TOC _____ feet determined by ____ Hole size 8/2 " - 5" CASING Long string Cemented with 60 sx. Size ____ ్ వ్ " TOC UNKNOWN feet determined by っる。 Tuztik Total depth ____8471 Injection interval feet to 866 feet to (perforated or open-hole, indicate which) PACKER SET @ 840' - 847' N870 238 lined with RASTIC (material) packer at <u>840</u> (brand and model) (or describe any other casing-tubing seal). Other Data 2. Name of Field or Pool (if applicable) AUSEU <u>/∑</u>/ No 3. Is this a new well drilled for injection? /7 Yes Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail (sacks of cement or bridge plug(s) used) 5. Give the depth to and name of any overlying and/or underlying oil or gas zones (pools) in this area.

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INJECTION WELL DATA SHEET

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Sche	ematic	To	bular Data	
	•	Surface Casing		*
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	7" CASTAL	TOC	*	
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		Intermediate Casing		-
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		TOC	•	
		Hole size 81/2		
	S'" CASTIOL	Long string		
	- Cression	51ze <u>5</u> *	Cemonted with	5 0
		TOC CLOKNOWY		
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STATE OF NEW MEXICO ENERGY AND MINERALS DEPARTMENT OIL CONSERVATION DIVISION

BRUCE KING GOVERNOR LARRY KEHOE

March 24, 1982

POST OFFICE BOX 2068 STATE LAND OFFICE BUILDING SANTA FE, NEW MEXICO 87501 (595) 827-2434

Barber Oil, Inc. P.O. Box 1658 Carlsbad, NM 88220

ATTENTION: Robert S. Light

RE: Exception to Rule 705-A for Injection Wells

Dear Sir:

Pursuant to your letter of March 4, 1982, requesting exception to Rule 705-A for your injection wells; the Oil Conservation Division (OCD) needs further information to be submitted. The information requested is as follows:

WELL DATA

The following well data must be submitted for each injection well covered by this application. The data must be both in tabular and schematic form and shall include:

- (a) Lease name: Well No.; location by Section, Township, and Range; and footage location within the section.
- (b) Each casing string used with its size and weight setting depth, sacks of cement used, hole size, top of cement, and how such top was determined.
- (c) A description of the tubing to be used including its size, lining material, and setting depth.
- (d) The name, model, and setting depth of the packer used or a description of any other seal system or assembly used.
- (e) The name of the injection formation and, if applicable, the field or pool name. Also list each formation penetrated and tops thereof.
- (f) The injection interval and whether it is perforated or open-hole.
- (g) State if the well was drilled for injection or, if not, the original purpose of the well.
- (h) Give the depths of any other perforated intervals and detail on the sacks of cement or bridge plugs used to seal off such perforations.

- (i) Give the depth to and name of the next higher and next lower oil or gas zone in the area of the well, if any.
- (j) Attach appropriate logs and test data that were run that would substantiate mechanical integrity.
 - (k) Submit the date when each injection well was shut-in.
 - (1) Specify for each well, anticipated dates for resuming re-injection.
 - (m) Relate each injection well to corresponding Division Orders, Case Numbers, and administrative approval (WFX, PMX, SWD, and Storage), where applicable.

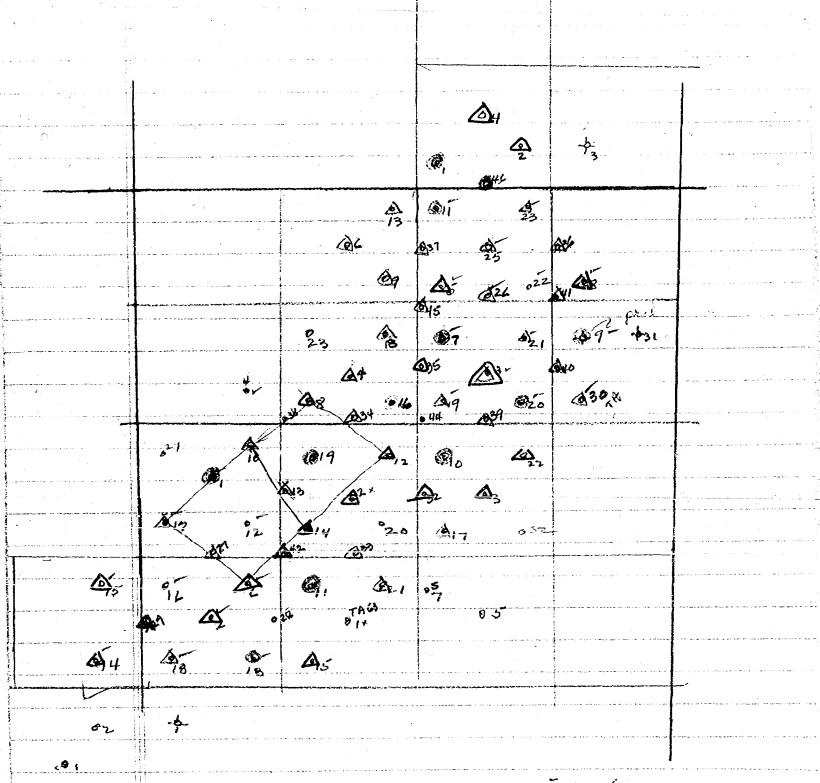
Enclosed is a Memo concerning Rule 705-A which might help. If you have any questions regarding this matter, please call me at (505) 827-2533.

Sincerely,

Oscar Simpson Water Resource Specialist

OS/dp

cc: Hobbs District Office Artesia District Office



indicated by Kooks on well as indicated by Nov 75 stat separt

GOVERNOR JACK M. CAMPBELL CHAIRMAN

State of New Mexico

Bil Conservation Commission

LAND COMMISSIONER GUYTON 8, HAYS MEMBER



P.O.BOX 2088 SANTA FE STATE GEOLOGIST
A. L. PORTER, JR.
SECRETARY - DIRECTOR

LEGAL DIVISION PHONE 827-2741

November 10, 1965

Mr. Dick Stamets Geologist Oil Conservation Commission P. O. Drawer DD Artesia, New Mexico

Re: Order No. R-263

Dear Dick:

In view of the language contained in the above order, it will not be necessary for the operator to obtain a WFX order prior to converting wells to injection on leases in the Russell Pool that were in existence at the time Order No. R-263 was issued. However, the operator will have to comply with all other Commission rules concerning the conversion of a well to water injection.

Very truly yours,

J. M. DURRETT, Jr.
Attorney

JMD/esr

RECEIVED

NOV 1 1 1965

D. C. C. ARTEBIA, OFFICE MAIN OFFICE OCC

1954 OCT 6 All 9:04

NEIL H. WILLS
P. O. BOX 529
CARLSBAD, N. M.
October 4, 1954

Cose 469 File

Mr. W. B. Macey, Oil Conservation Commission, Box 871, Santa Fe, New Mexico

Re: Case #469 - Neil H. Wills

Dear Sir:

In accordance with your letter of September 20, 1954, we are listing below the wells which have been converted to water injection wells in the Russell Pccl:

Well No.	Location	Sec.	Twnsp.	Rongo	ш т <u>у</u>
19 43T17 44T18 47T21 48T22	2322' FNL & 2333'FEL 1658' FSL & 2338'FEL 1658' FNL & 2339'FWL 959' FSL & 2339'FWL 2322' FSL & 1669'FEL	13 13 13 13 13	20 20 20 20 20 20 20	28 28 28 28 28 28	849: 844: 829: 820: 869:

In the wells listed above, all tubing, rods, pumps, etc., have been removed. The wells were cleaned out to bottom, and packed with pea gravel from the bottom of the well up to the bottom of the 7" casing cemented in each well. Water lines were then connected to the 7" csg. at the top of each well, and all to the engineers in charge of the project.

Inasmuch as the injection was started at various times during the month of September, these new injection wells will appear on the Form C-120-B for the month of October, 1954.

Very truly yours,

Hobert L. Bunnel

RLB/pl cc: L. A. Hanson 205 Carper Bldg., Artesia, N. M.

Cr.

OIL CONSERVATION COMMISSION P. O. BOX 871

SANTA FE, NEW MEXICO

September 20, 1954

Robert L. Bunnel P. C. Box 529 Carlabed, New Mexico

Re: Case 469-Neil H. Wills Water Flood Project-Russell Pool

Dear Mr. Bunnel:

Your letter of September 8, 1954, to Mr. Hanson, pertaining to the above captioned case and water flood project has been referred to me.

The only information which we desire would be the necessary information pertaining to the recompletion of in-mit wells. In the event your productive volume approaches the present maximum daily allowable per 40 acre unit, it may be necessary for this office to approve administratively an increase in allowable. If at any time, this becomes necessary, please edvise.

H. B. Macey Secretary-Mrector

MBM: 8K

Mr. Hanson cos Artesia, New Mexico

NEIL H. WILLS
P. O. BOX 529
CARLEBAD, N. M.
September 8, 1954

HEIVE D

SEP 9 1954

Mr. L. A. Hanson, 205 Carper Building, Artesia, New Mexico

Oli Cons. Commi ARTESIA OFFICE

Dear Mr. Hanson:

in the Russell Pool, we have decided that a full flood of the entire field is warranted. We are now in the process wells and about the first of next week we will commence any additional information other than the monthly Form 120-B, the functional it.

peculiarities of a water flood project, we will not be reaches peak production.

Very truly yours,

Robert L. Bunnel

RLB/pl

From

Memo

Jo Copy sent to
Weil Wills
2-11-53

BEFORE THE OIL CONSERVATION COMMISSION OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION COMMISSION OF NEW MEXICO FOR THE PURPOSE OF CONSIDERING:

CASE NO. 469 ORDER NO. R-263

THE MATTER OF THE APPLICATION
OF NEIL H. WILLS, ET AL, FOR APPROVAL
OF A SECONDARY RECOVERY PROGRAM (BY
WATER FLOODING) IN THE RUSSELL PCCL,
EDDY COUNTY, NEW MEXICO, IN SECTIONS
12, 13 AND 14, TOWNSHIP 20 SOUTH, RANGE
28 EAST, NMPM.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. January 15, 1953, at Santa Fe, New Mexico, before the Oil Conservation Commission, hereinafter referred to as the "Commission."

NOW, on this /O day of February, 1953, the Commission, a quorum being present, having considered the testimony adduced and the exhibits received at said hearing, and being otherwise fully advised in the premises;

FINDS

- (1) That due notice having been given as required by law, the Commission has jurisdiction of this cause and the subject matter thereof.
- (2) That the petitioner's request to revert to secondary recovery methods by a water injection program will tend to prevent waste and should be granted upon the condition that said program be pursued in the manner outlined at said hearing.
- (3) That a secondary recovery program by water injection is of an experimental nature in this particular pool, and periodic reports should be submitted to the Commission by the petitioner disclosing its acts and doings in the matter.

IT IS THÉREFORE ORDERED:

That the applicant, Heil H. Wills et al, be and hereby is given the right to institute a secondary recovery program on leases in the Russell Pool by injecting water into the Yates sand reservoir.

IT IS FURTHER CROSSED, That petitioner submit quarterly reports to the Commission disclosing all of its acts and doings and setting forth therein the progress it has made by the adoption of its secondary recovery program.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO OIL CONSERVATION COMMISSION

Edwin L. Mechem, Chairman

R. R. Spurrier, Secretary

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BEFORE THE OIL CONSERVATION COMMISSION OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION COMMISSION OF NEW MEXICO FOR THE PURPOSE OF CONSIDERING:

CASE NO. 469 ORDER NO. R-263

THE MATTER OF THE APPLICATION
OF HEIL H. WILLS, ST AL, FOR APPROVAL
OF A SECONDARY RECOVERY PROGRAM (BY
WATER FLOODING) IN THE RUSSELL POOL,
EDDY COUNTY, NEW MEXICO, IN SECTIONS
12, 13 AND 14, TOWNSHIP 20 SOUTH, RANGE
28 EAST, NMPM.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. January 15, 1953, at Santa Fe, New Mexico, before the Oil Conservation Commission, hereinafter referred to as the "Commission."

NOW, on this odd day of February, 1953, the Commission, a quorum being present, having considered the testimony adduced and the exhibits reveived at said hearing, and being otherwise fully advised in the premises;

FINDS:

- (1) That due notice having been given as required by law, the Commission has jurisdiction of this cause and the subject matter thereof.
- (2) That the petitioner's request to revert to secondary recovery methods by a water injection program will tend to prevent waste and should be granted upon the condition that said program be pursued in the manner outlined at said hearing.
- (3) That a secondary recovery program by water injection is of an experimental nature in this particular pool, and periodic reports should be submitted to the Commission by the petitioner disclosing its acts and doings in the matter.

IT IS THEREFORE ORDERED:

That the applicant, Weil H. Wills et al, be and hereby is given the right to institute a secondary recovery program on leases in the Russell Pool by injecting water into the Yates sand reservoir.

IT IS FURTHER CRUERED, That petitioner submit quarterly reports to the Commission disclosing all of its acts and doings and setting forth therein the progress its has made by the adoption of its secondary recovery program.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

OIL CONSERVATION COMMISSION

Edwin L. Mechem, Chairman

E. S. Walker, Momber

R. R. Spurrage, Secretary

Original

BEFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

TRANSCRIPT OF HEARING CASE NO. 469

Henrickson's Reporting Service 2224 - 47th Street Los Alamos, New Mexico

Original

BDFORE THE
OIL CONSERVATION COMMISSION
SANTA FE, NEW MEXICO

TRANSCRIPT OF HEARING CASE NO. 469

Henrickson's Reporting Service 2224 - 47th Street Los Alamos, New Mexico

BEFORE THE OIL CONSERVATION COMMISSION SANTA FE, NEW MEXICO

JANUARY 15, 1953

In the Matter of:

The application of Neil H. Wills, et al, for approval of a secondary recovery program (by water flooding) in the Russell Pool, Eddy County, New Mexico, in Sections 12, 13 and 14, Township 20 South, Range 28 East, NMPM.

TRANSCRIPT OF HEARING

BEFORE:

Mon. Ed Mechem, Governor and Chairman Hon. R. R. Spurrier, Secretary and Member Hon. E. S. Walker, Member

MEIL H. WILLS

having been first duly sworn, testified as follows:

WILLS - My name is Neil Wills. I am the operating partner in the lands in the Russell field of which we'd like to get permission from the Oil Conservation to flood.

The partnership owns all the lands in the field and possibly six or eight hundred acres of lands surrounding the field in almost all directions.

There are about fifty shallow wells in this field producing from the Yates Sand at a depth of oh, eight hundred to nine hundred feet.

And I have an engineering report prepared by the Cable Engineering Company of Wishita Falls, Texas which I'd like to submit to the Oil Conservation Commission and I think in this report, all the engineering facts are presented and I don't believe I can add any facts to the report. If there are any questions, I would be glad to try to answer them. I haven't very much of a case because we own all the lands and the lands, by the way, are all Federal lands.

The field is very small ----

WHITE - Then Mr. Wills, what you're asking the Commission to do is to read that report and issue their order based upon it?

WILLS - Yes, sir. That's right.

GRAHAN - Where will you obtain the water, Mr. Wills?

WILLS - We planned on obtaining the water from the top of the Capitan Reef Section, right below the Yates formation. It would be a very - I mean, that water would be very bad water, salty water but we feel that it will be all right for flooding.

WHITE - What is the source of your water? And who will control it?

WILLS - Well, the water is from the wells we put into the Eussell

sand and it will be contolled by our engineer-in-charge.

GRAHAM - Is there underground water in that valley area?

WILLS - No, it is outside the area.

WHITE - What kind of packing are you going to use?

WILLS - Facking? Well, the present - the wells that will be incut wells, will be well packed. I don't understand the question. I'm not an engineer, I didn't do the engineering work on this.

WHITE - The answers to these questions will be in the report?

VILLE - I hope so.

MAGEY - Mr. Wills, you are going to take the water out of the No. 5, is that correct?

WILLS - Or similar wells that we might obtain water from.

MACEY - They're all abandoned wells?

WILLS - That's right.

MACET - You're going to perforate the strong section and then in-

WILLS - That's right. The water that we will obtain is about three hundred feet below the Russell Sand.

GRAHAM - What is the production of those wells. Mr. Wills? What do they do? They've failed, haven't they? What do you get out of them?

WILLS - We're making about two barrels per day per well. About 100 barrels a day for the field.

GRAHAM - What are your expectations? Will it materially increase? WILLS - Well, the engineer ways that if the flood is successful, we will get as much oil from the flood as we have already, which will be about a million barrels.

SPURRIER - Are there any other questions of this witness? MACEY - What you plan to do is get a pilot program to start with -WILLS - That's right.

HACEY - If it works out successfully, you intend to expand it?

WHLE - That's right. It will require about a year, according to the engineer, to tell. This plat here shows, in red, the outline of the acreage that we own. And you see, the field is right in the middle of it. There's a thousand acres, at least the field is about four hundred acres.

MACEY - Was this Cable Engineering Company who made this survey for you, were they able to cut any cores yet or is that something - -

VILLS - The last hole I drilled on Mumber 26 to is the only hole which we cored. And that was about two years ago. That's the only core information we have at that one well.

MACEY - And that's what you're basing your proposal - - -

WILLS - That's right.

MACEY - upon the facts that you got from there?

WILLS - That's right.

MACEY - They say the continuity is pretty uniform down there, isn't it? I mean, it has characteristics.

WILLS - Well, it's very shaley. Whether it will be successful, we

don't know. It's very shaley and it's not the best type of sand probably. But it's - - so much oil remains in place, that it seems like we should try something to get additional oil out. There's oil there - there's no question about it.

MACEY - There's a lot of Yates fields down in that area that if this were successful, the same thing would probably be incorporated with them.

WILLS - This is the only Yates Sand field.

MACEY - And the rest of them are lime?

WILLS - That's right. The most of the production around Carlsbad is from the base of the Yatos in the lime. There are some Yates fields in Lea County but not very close to Russell.

SPURRIER - Mr. Wills, do you offer this exhibit in evidence? WILLS - Yes.

SPURRIER - Without objection, it will be received. Are there any further questions? If not, the witness may be excused and the case will be taken under advisement. The next case on the docket is Case 470.

STATE OF NEW HEXICO > COURTY OF LOS ALAMOS >

I HEREBY CERTIFY that the foregoing and attached transcript of hearing on Case 469, before the Oil Conservation Commission.

State of New Mexico, at Santa Fe, on January 15, 1953, is a true and correct record of the same to the best of my knowledge, skill and ability.

DATED at Los Alamos, New Mexico, this 16th day of January, 1953.

Lucion M. Humshaw

Case 4 69

P. O. BOX 529 CARLSBAD, N. M.

December 23, 1952

Mr. Bill Macey Box 871 Santa Fe, New Mexico

Dear Mr. Macey:

Pursuant to our telephone conversation of the above date I am enclosing herewith a plat of the Russell Pool showing the proposed Water Flooding Project.

It is proposed to clean out the old Turner #5 well to an approximate depth of 900' as a source of water. For the pilot project the wells indicated in yellow on the map will be used. If the pilot project proves successful the wells indicated on the map in green will be converted to water input wells thereby expanding the Water Flood Project to include the entire

Work will be done on this Project under the supervision of the Cable Engineering Company of Wichita Falls, Texas.

Very truly yours,

Robert L. Bunnel

RLB:mk enc.

COPY

NEIL H. WILLS

COPY

P. O. Box 529

Carlsbad, N. M.

Dec. 19, 1952

Mr. L. A. Hanson Oil Conservation Commission, Artesia, N. M.

Dear Mr. Hanson:

Enclosed herewith is a field map showing the proposed Water Flooding Plan of the Russell Pool.

The general outline of the Plan is as follows:

- 1. Initiate a pilot Water Flood incorporating 6 water input wells and 2 oil wells as shown on the map.
- 2. Recomplete the George Turner # 5 well in the 900 foot limestone as a source of flood water.
- 3. Expand the pilot Flood, if successful, to a field wide flood incorporating a 20 acre 5-spot spacing.

If your office has any other requirements to be met regarding the project please advise us so that we can get them taken care of as we would like to start the project about the first of the year.

Very truly yours,

Robert L. Bunnel

RLB:mk enc.

SECTION 5. PER DIEM-RATES. -

- A. Per diem shall be paid to public officers and employees only in accordance with the provisions of this section.
- B. Except as provided in Subsections C through J of this section, per diem for in-state travel away from home and out-of-state travel by public officers and employees shall be computed as follows:

REIMBURSEMENT

LENGTH OF . TRAVEL TIME	Column l In-State	Column 2 Special Munici- palities In-State	Column 3 Out-of-state	Column 4 Special Areas Out-of-state
Less than 6 hours	None	None	None	None
6 hours or more but less than 12 hours	\$ 9.00	\$11.00	\$13.00	\$16.00
12 hours or more but less than 18 hours	\$18.00	\$22.00	\$26.00	\$32.00
16 hours or more but less than 24 hours	\$27.00	\$33.00	\$39.00	\$48.00
24 hours or more but less than 30 hours	\$36.00	\$44.00	\$52.00	\$64.00
for each additional 6 full hours	\$ 9.00	\$11.00	\$13.00	\$16.00

Per diem may be reimbursed in accordance with Column 4 to any public officer or employee for travel time outside the continental United States or to the metropolitan areas of Boston, New York City, Washington, D. C., Philadelphia, Dallas, Los Angeles, San Diego, San Francisco, Chicago or New Orleans; and in accordance with Column 2 for state officers and employees for travel time whose overnight destination is one of the following municipalities: Santa Fe, Taos, Farmington and Albuquerque.

DFA Rule 78-3 7/1/81

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